The Builder.

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The Royal Academy.

THIS is evidently not a good painting year. We have already noticed that the New Gallery is below its mark; and the same must certainly be said of the pictorial portion of the Royal Academy exhibition, by far the larger and more popular element of the show. Sculpture stands at a fairly high level; not so high as in some previous years, but still showing much of interest and excellence both of conception and execution. But in painting the proportion of mediocre and uninteresting work is indeed formidable; and there is no one remarkable work—no "picture of the year"—to counterbalance this prevalent character of weakness. Nor are there any attempts at new effects or new aims in painting to interest one and provoke discussion. It is a mediocre Academy. Of course one could not but expect that the loss of Leighton and Millais would be felt for some time to come; and their only survivor of the same calibre, Mr. Watts, exhibits only a single half-length portrait.

Three pictures may perhaps be singled out as the three best of the year: Mr. Tadema's "Baths of Caracalla," Mr. Abbey's "O Mistress Mine," and Mr. Somerscales' "Off Valparaiso." Mr. Tadema's picture, indeed, would be a sensation work if he had not made so many sensations of the same kind, and if it were not, as usual, deficient in human interest. Architecturally, it is a highly interesting work. He shows us the Thermæ in all their pristine splendour and thronged by a crowd of bathers. The picture is cut in two vertically by the shaft of a great serpentine column in the foreground, below which are seated three young ladies; the middle figure, facing the spectator, admirable both as a piece of drawing and as a kind of revival of what we may fancy to have been the late Roman type of young woman; in which latter respect, however, she is entirely contradicted by the style and expression of the girl on the right, who is quite modern, and might have come out of an English parsonage. The view of the great hall beyond is finely and learnedly carried out; the marble galley, made as if floating on the water, has, we believe, archæological tradition to support it. The planes in which the bathers behind are grouped seem a little confused; at least, the perspective of the building does not show clearly why the two men near the marble galley should be twice the size of the groups nearest to them; no doubt the author has got the plan and distances all right in his head, but they do not come out quite obviously in the painting. Mr. Abbey's painting, illustrating the song from "Twelfth Night," is perhaps the most original and interesting in the collection. It shows a vine-covered loggia with whitewashed piers, through which is seen middle-distance foliage painted in rich and warm tints, forming in itself a remarkable bit of colour; in the foreground a lover in long red cloak is appealing earnestly to a lady who leans against one of the piers, and whose face is singularly expressive of feeling; by their dress and style they are lovers of the Renaissance. There is a fine and very original style about this picture, though it is not so remarkable a work as the Richard and Lady Anne of a former year. Mr. Somerscales' "Off Valparaiso" is a repetition of the *motif* he has before employed; a tub of an ocean tramp comes up under full sail towards the front of the picture, while a rowing boat crosses the foreground to intercept her. The realism of the bulgy hull splashing through the water, and the care and knowledge with which the crowd of sails with their curves and shadows are drawn and painted, show the most careful observation and painstaking execution, which may be better realised, perhaps, by comparing the work with the two very creditable examples of the commonplace of sea and ship painting to be found in Gallery II.

One of the largest and most important works of the year is also a ship picture, Mr. Wyllie's "Battle of the Nile," which among other uses may serve to remind people of the historical fact that this great naval battle was fought in the dark, after nightfall, a fact which must have given all the more dramatic effect to the great incident of the fight, the blowing up of the *L'Orient*, which is the moment selected by the painter, though the *L'Orient* is kept in the background. A small plan of the position of the ships is given beneath, with the direction of the wind indicated. This is a fine and carefully considered picture, and goes perhaps as far as silent canvas can in conveying to the mind some idea of the tremendous scene which must have been produced by the close fighting at night of these large sailing men-of-war of the old type, with their lofty hulls, towers of sail, and numerous guns, and the devastation made in the wooden hulls and rigging of the ships that had the worst of it. One of these, a dark draggled mass with all her masts overboard, is near the foreground. This, which has been bought with the Chantrey Bequest, is the most important work its author has painted, and will certainly advance his reputation.

It is a year of Jubilee pictures also; three artists having painted the scene opposite the west front of St. Paul's on the occasion of the Queen's halt there on the procession day; whether these are commissions, or the outbreak of patriotism on the part of the painters, or an appeal to the patriotic sympathies of the public, we know not; the selection of exactly the same subject by three painters can hardly be a mere accident, and can hardly have been made on purely artistic grounds. There is good reason why such events should be recorded in painting, but they do not present much scope for picture-making in the higher sense of the word. Of the three painters, Mr. Gow, Mr. Charlton, and Signor d'Amato, we think Mr. Gow has the best of it, and has produced a careful work of the kind, which will bear looking into, though neither he nor either of his two compeers have made very much of the architecture of St. Paul's, so far as it is seen. Mr. Charlton has contrived to get the picturesque figures and costumes of the Indian contingent in the foreground, with good effect.

Among the other pictures in which the human element is predominant, what can we pick out as of most essential interest? In Gallery XI. Mr. J. Young Hunter has interested artists, at all events, though probably not the general public, with "My Lady's Garden," where a mediævally-clad figure is accompanied by peacocks, who in colour and action make the best portion of the picture. M. Bouguereau sends one of his well-drawn but conventional classicisms, "Elegie," a nude female figure bowed over

a stele or altar, at the foot of which sits a weeping cupid; a figure academically admirable—notice especially the drawing of the right hand and foreshortened arm; but deficient in just what such a picture should have—sentiment, sincere feeling. This quality of sincerity is not wanting in Mr. Draper's picture, "Trailing Clouds of Glory"; a child by a sunlit pillar in a church, lifting up her hands in a spiritual ecstasy. In Gallery I. also is Mr. Clausen's little idyll of peasant life, "Going to Work," a real work of art, in which figure and landscape form a complete whole. The poetry of peasant life is rather well represented this year; in Mr. La Thangue's "Harrowing," for instance, where a man and woman pull at the harrow together in the level evening light, and his "Love in the Harvest Field," an evening scene where the general tone, cold and depressing, is rather sacrificed for the purpose of giving a glow to the moon. His "Cider Apples," too, is a good picture, not of sentiment, but of composition and sunlight and breadth of effect. In the large Gallery (III.) the supply is painfully scanty; so poor a "line" has seldom been seen; perhaps the lowest deep is reached in Mr. Goodall's absurd attempt at an illustration of Mr. Kipling's "Mandalay." Mr. Prinsep's "Cinderella," standing in the corner of the ingle-nook watching a pot boil, is an efficient figure, but hardly interesting; Mr. Abbey's "Who is Silvia" a mere piece of Renaissance costume, the principal figure stiff and unsympathetic, and by no means illustrative of Shakespeare's song. In Gallery IV. Mr. Padday (a name new to us) achieves a bit of real character in "Marooned," a work that suggests "Treasure Island," and seems to revive one of the violent phases of the life of a past epoch. "The Harvesters' Return," by Mr. E. Stott, is a small work possessing both pictorial effect and sentiment; the twilight sky a fine piece of colour. In connexion with this class of work should be mentioned Mr. Van der Weyden's charming and poetic little work, "Homeward" in Gallery II. In Gallery V. Mr. Tuke, in "The Diver," realises one of the best editions of his favourite effect of nude figures in sunlight; one is amused to recognise in the naked lad lounging in the stern of the boat the same who figures as "Cupid" in the New Gallery. Here too Mr. Dendy Sadler shows us an admirable bit of the humour of every day life in "The Christening;" notice especially the elderly *blasé* gentlemen in the background affecting an interest in the baby. But this clever artist is at his best in "The Plaintiff and the Defendant" in Gallery XI., where the two parties and their friends have got (unnoticed by the defendant) to contiguous tables during the luncheon half hour out of court; a work of true humour and not without its touch of pathos. Señor Bilbao's "Dance of the Choristers" in Seville is a work not to be passed over, so curious is its interest of scene and costume; it is carefully painted though a little heavy in effect. Mr. Draper's "Ferdinand and Ariel," in the same room, is remarkable not so much for the figures as for the weird aspect of the extended coast landscape and the strange unreal colour on the sea, giving to the scene certainly a look of an enchanted place, where you might expect strange things to happen. Mr. Hillingford's "Scots Greys among the French guns at Waterloo" is the best battle-piece of the year, but that is not saying much; the rest are wretched commonplaces; or Lady Butler's Alma picture, if not commonplace, is theatrical. Mr. Dollman gives us a good idea of Robinson Crusoe, seated on barren sand-hills and looking out to sea, his melancholy dog beside him.

In Gallery X. Mr. Byam Shaw exhibits a large and elaborate mistake in his "Love the Conqueror," which is clever enough, but only an imitation of early Italian art, the insincerity of which is too obvious. "Love" sits on a black war horse on a knoll, and around file his victims in a long procession; among whom are recognisable Dante, Shakespeare, Beethoven, and Henry VIII.; a sufficiently motley assemblage; among them are probably many other historical personages if one had a key to the group; but it is hardly worth while, for the thing impresses one as an elaborate joke. Of the nature of a joke too is Mr. Collier's "The Garden of Armida," an old title to a modern subject; Rinaldo here is in evening dress and drinks champagne with pleasing modern ladies at a modern summer garden dinner party. Practically we presume it may be taken as a portrait group; and the title does no harm. We should not have passed over Mr. Hacker's "The Golden Hour" (Gallery VIII.), a large picture of people reclining under trees in some Elysium, and noteworthy for its rich colour and fine effect of light, and a certain indefinable originality in style. One regrets to find that the exhibition contains nothing from Mr. Arthur Hughes.

Portraits make perhaps the best show among the pictures. The President's, of the Hon. Violet Monckton, at the top of the long gallery, is a stately and monumental but rather hard work. Sir W. Richmond's portrait of Miss Muriel Wilson in the same gallery is also a portrait of the stately or sumptuous order, for the production of which class of picture he has had in this case an ideal subject (unless he has flattered the lady very much); but though not hard in execution, it is rather stiff and deficient in life. Of other portraits one may specially mention Mr. Sargent's half length of Miss Octavia Hill, balanced by an equally good half-length by Mr. Shannon of Lady Mathew; still better Mr. Sargent's of Miss Jane Evans. In his portrait of the Earl of Crawford, in the same room, Mr. Orchardson has contrived, as usual, to make a portrait of a gentleman in ordinary costume the basis of a very fine study in colour, not exactly what can be met with in the real world of tailors' goods, but something a great deal better. Even with so fine a work as this, however, one is inclined to grumble at Mr. Orchardson for confining himself to portraits this year; one is too anxious to have something of a different kind from him. Mr. Riviere's portrait of Lady Tennyson, attended by her late father-in-law's old wolf hound, is very good as to the dog, but certainly does no justice to the lady. Mr. Frank Bramley's portrait of an officer is a good contrast, in its broad free style, to the flat hard uniform portraits to be found in one or two other corners of the exhibition. This and Mr. Orchardson's Earl of Crawford are valuable as showing how far the power of style goes in raising a portrait from a mere representation to a work of art.

Landscape is better represented, on the whole, than figure pictures; though there is no great work (and one may say there very seldom is at the Academy), there is a fair proportion of good landscapes. In most cases what seems to be wanted is a great style in landscape. The nearest to it is Mr. J. W. North's "Among the Galtees" in Gallery VIII., which is in a broader style than is usual with him, and has less than usual of his charming but very decided mannerisms. It is a fine painting of hill scenery, both in drawing and sentiment. Mr. Alfred Parsons, too, in "A Village by the Links" (Gallery VI.), surprises us by a solidity of treatment and a certain seriousness of style and feeling which we are not accustomed to in his works; here is also an escape from a mannerism, and one much weaker and less interesting than Mr. North's. Mr. David Murray seems to have more and more lost the feeling for breadth and unity in landscape effect; his works are what may be termed "spotty;" such a one as "Green Summer Time," for instance (Gallery III.), impresses one as a collection of details of landscape rather than a whole. Mr. H. W. B. Davis has almost repeated, in his scene "In Radnorshire," the same work which he gave us a year or two ago; a very pretty picture, but less interesting the second time than the first. "Cerig-Gwynnion," in the large room, is his most important work, with a beautifully real and delicately-handled middle distance; the smaller work in Gallery II., "Going Home," a kind of evening pastoral, is also very beautiful in its way; but it is realism—realism of a high order no doubt—rather than intellectual treatment of landscape art. Mr. Adrian Stokes's "The Old Dyke" shows his usual truth of observation but less perhaps than his usual unity of treatment; it is not one of his best works, though one of the best landscapes in the exhibition. In the same room Mr. Mark Fisher's "Valley of the Arun" illustrates some of the finest qualities of style in landscape painting; a work quite above the ordinary run of English landscape in this sense. Among other landscapes to be looked at are Mr. Waterlow's fine and poetic "Forest Oaks"; Mr. Jacomb-Hood's "Corn-flowers," a high field with outline dark against the sky, peopled by a woman and sheep; Mr. East's "A Coombe in the Cotswolds"; Mr. Reid's "A Kentish Idyll," simple to a degree in its materials, but broad in style; Mr. Arnesby Brown's "The Crest of the Hill," with a cloud hanging over it—a landscape with a broad style; various small works by Mr. Brett (who exhibits no large work this year) of which "Étretat," with the "greening gleam" in the foreground sea, is charming. Among small experiments, as they may be called, in special effects, Mr. Thaulow's "Night" is a little thing worth attention for its truth of effect and originality of style; his other work, called "Smoke," might be rather entitled "Smudge." We do not know what Mr. G. D. Leslie is about now, with his landscapes all based on variations of one prevalent tone, as in "The Peaceful Highway," where the wooden starlings of the bridge piers are approximately the same colour as the stonework, and everything else in keeping. There is a kind of charm about the work, but it seems to us to be, properly speaking, neither nature nor art.

Sea pieces are rather strong this year, in quality if not in quantity. Besides Mr. Wyllie's and Mr. Somerscales' works

already mentioned, Mr. Hemy sends a most powerful painting representing "Smugglers" chased by a revenue boat through a tumbling sea, which, like the picture in the New Gallery, shows rather a new way of handling sea on the part of the artist; the whole is in a bolder style than his usual one. We have besides a smaller but admirable little work by Mr. Somerscales in Gallery I.; a fine picture of the "Yankee Clipper, *America*" apparently in an Atlantic sea—did she really cross the Atlantic with all that fore-and-aft sail spread?—and a good picture by Mr. Gouldsmith, "Sundown at Sea," a scene of dark tumbling billows with the masts and sails of a large ship rising from behind one of the heaps of water, her hull completely hidden.

Of the sculpture we shall speak more particularly on another occasion.

THE GHOST OF WHITEHALL PALACE.

IT is a tribute to the genius of Inigo Jones that after nearly three centuries the ghost of the great design of his life, that of the Royal Palace for Whitehall, continues to haunt the imagination of students of architecture.

Let a Government building of any scale be projected, and at once a cry is raised for the realisation in some form of this grand ideal. There must be some magic in a design that is regarded as a goal to aim at, not merely by amateurs more or less gifted, but also by practised architects, amongst whom we believe Mr. Waterhouse may be reckoned; for we remember that in a note concerning a design for the abortive War and Admiralty competition it was stated that he had entertained the idea of attempting to realise something of its magnificence. As an architect of experience he perceived, what the amateur constantly overlooks, namely, the prohibitive scale of Jones's design for a modern building; finding that the offices of to-day were not to be clothed in the inelastic dress of this Renaissance palace design, he appears to have drawn up a diagram illustrating the impossibility of its floor heights of 30 ft.

We observed, with some amusement, that in a recent scheme by a noble amateur, put forward for the new War Office, it was calmly proposed to run a concrete floor at the half height, the assurance being given that this "was frequently done in Europe and America, and would not lessen the dignity of the opening or disturb the architrave." What sort of lighting would be obtained by such an unarchitectural suggestion is apparently a detail that has been ignored, so we throw out to the author of this up-to-date scheme the idea that the upper half of his floor height should be the red tape and paper depôt of the clerk below, access being provided by a spiral stairs on the model of an A.B.C. tea-shop, as underneath, say, the Grand Hotel.

Besides, however, this trifling matter of scale, the reviver of Inigo Jones's palace has a preliminary question to settle as to which design he accepts as Jones's, whether that of Campbell given in "Vitruvius Britannicus," or that of Flitcroft and Kent in the so-called "Designs of Inigo Jones." These schemes are not to be reconciled with each other, and from the choice made by the adapter we shall be able to form some idea of his appreciation of the great architect. Further, there is an overlooked design, displayed in two perspectives belonging to her Majesty, which, it may be added, alone of the three seems to have a stamp of authenticity.

The Campbell design in "Vitruvius Britannicus" is hardly to be regarded with patience. It is a miserable travesty of Jones's ideas; while the Flitcroft-Kent drawings are hall-marked eighteenth-century all over, and in every detail bear traces of unintelligent alterations and of caricature. There is a sweetness and grace of detail and proportion in the only portion of the palace that has been executed, the Banqueting House, that commands the admiration of architects who derive no pleasure from the contemplation of later and more frigid examples of Renaissance art, and in our judgment there is in the perspectives at Windsor alone any trace of this quality of Jones's design.

Beyond, however, these discrepant designs there is another and greater difficulty, namely, that the Banqueting House, as built, has a basement about 13 ft. high, while the perspective designs show the palace with the lowermost order standing on the ground. Over this basement the later copyists have stumbled terribly. Campbell shows his park front with a basement, the Banqueting House, much as built, being incorporated; but in all the other elevations he ignores it. In the Flitcroft-Kent drawings this podium is also ignored in the external elevations, but in the long section through the great court, where the Banqueting House had to be shown, a great hash is produced in the main lines of the design, the two orders and basement as built being more or less fitted into the height of the two orders, minus basement of the centre and wings of the façade.

This bungle is reproduced in the latest scheme put forward, carrying in itself a sufficient condemnation of the design. That Inigo Jones, as a close student of Roman work and a follower of Palladio, would, in a design of the rank and importance of a Royal palace, have broken his main entablatures across and used orders of such a discordant scale, is inconceivable. It seems to us indispensable for the adapter to reconcile his proposals with the existence of the basement in the part executed, on other terms than those.

This basement, or podium, is somewhat of a puzzle. If we accept the perspectives at Windsor as the original design of Inigo Jones, and agree to the date of 1618 ascribed to them, we must suppose that in 1619, when the Banqueting House was commenced, Inigo Jones found that the site, or the level of the old palace, or other cause, made such a basement necessary, and that it is an addition to the first idea. We may readily imagine that he would seize on such a feature as giving a greater dignity and importance to his orders, and as being in accordance with the main ideas of Italian design. We do not see how the conclusion can be resisted that the whole palace must have had a podium throughout had it been carried out. There would have been nothing unusual in this, for it cannot be too clearly recognised that Renaissance architecture originating in Italy has been profoundly influenced by Italian habits and climate.

The ground floor in Italy was of little value, both by tradition and climatic cause, while the *piano nobile* is the first floor, a radically different use to our own, and one which led to endless difficulties for our adapters.

Few had the courage to build such costly and useless basements as those of the Banqueting House or of Blenheim, and yet Italian use had given such value to the heavily-rusticated ground story as a podium to the order that the feature was not one to be lightly abandoned.

In a way the most English of Renaissance designs with orders is Longleat, where the Italian idea of a progressive scale in the columns is reversed, and the ground floor has the tallest order, that being the true *piano nobile*, while the columns above are heroically cut down to the scale of the bedrooms, the topmost order being the smallest. In such a case a mere plinth, involving small sacrifice, might be in scale; and there is some plausibility, on paper, in the idea of an order to each floor, but in reality few things are more futile than columns of inadequate scale, as in the Circus at Bath, for instance, where the normal heights of the stories make each order mean and petty by its lowness.

There is, therefore, no possible cheap casing up of modern Governmental offices of, say, a 13 ft. standard in height of the rooms within the noble scale of Inigo Jones's palace, with its floors of 30 ft. height, with a further obligation to employ the most valuable ground floor area in a basement or podium of æsthetic value only.

The real point, moreover, is this. What need is there to attempt such an adaptation? And what honour would it do to the great architect to thus misuse his design? The author of Covent Garden piazza, with its nobly realised barn-church and surrounding buildings, and the designer of the north side of Lincoln's Inn-fields, could as well conceive the possibilities of a nest of Governmental clerks' offices as of a Royal palace, and would, we are persuaded, have produced a design as far different for each as are the realities of the case.

Whitehall Palace remains a dream—a haunting ghost, if you will—but not a possibility, in England, because Strafford was not a Richelieu, and the execution before Whitehall decided political issues which in the contrary result might well have been expressed in such a palace as this.

Seeing that the fragment built cost in money of those days not far from 16,000*l.*, and that the size of the whole would have approximated to Versailles, we can roughly estimate the social and political aspects of the scheme, realising the truth of the saying that the cost of the French palace was the Great Revolution.

NOTES.

The Education Debate.

IT is a matter of satisfaction that the House of Commons last week discussed the education estimates in a fuller and more interested House, and in a more serious manner than usual. We have insisted over and over again that technical education cannot be really advanced unless elementary education as a whole is put on a better footing, and unless the country as a whole can be induced to take a real interest in the subject. We are inclined to think that public opinion is beginning to realise that educationally England is behind other European countries. We shall not consider that technical education

is standing still if the House of Commons is beginning to show interest in elementary education. It is clear from the speech of the Vice-President of the Council that there is far too much child labour to be found in England, which prevents elementary instruction from having its full value. It is equally clear that elementary education is ended at too early an age. When these two faults are, to some extent, at any rate, done away with, technical education will grow almost of its own accord. At present national funds are largely wasted by reason of an imperfect elementary education.

The Small Houses Bill.

THE deputation last week, as we were going to press, to Mr. Chamberlain from the Building Societies, on the subject of the Small Houses Bill, was somewhat of a difficulty to the author of this measure. As we have pointed out, this Bill is a bit of electioneering pure and simple. As Mr. Chamberlain does not wish to offend the numerous members of building societies, he minimised the proposed Act as much as possible. He actually suggested that members of building societies, being voters, could prevent Local Authorities from putting the Act into force. He offered, in Committee, to safeguard it even to a greater extent than it is at present. If a measure such as this is needed it should have every opportunity given to it of being used; at present, those who have it in charge in Parliament seem to wish to make it as inoperative as possible. We have more than once pointed out that it can be of little use. But the placing of an electioneering advertisement in the Statute Book is not statesmanship, and the proceedings in Committee make the measure look more and more unworkable. On Monday last it passed through this Parliamentary ordeal, and has now but to pass the third reading in the House of Commons.

The L.C.C. and the London Gas Inquiry.

MR. H. E. HAWARD, Comptroller of the London County Council, is the second witness who has been heard by the Select Committee appointed to make inquiries concerning the different prices charged for gas within the Metropolis. Bad management, said Mr. Haward, was the cause, in his opinion, of the differences between the three metropolitan companies. Statistics were put forward which showed that the Gas Light and Coke Company have for many years paid more for coal, and obtained less for residuals, than the South Metropolitan Company, although the former company have a much larger business than the latter. Mr. Haward considers that the most serious differences between the companies are to be found in the capital charges. The following figures show the capital employed in the three gas undertakings in 1897 :—

—	Amount "fixed" and "floating."	Per ton of coal carbonised.	Per million cubic feet of gas sold.
	£	£	£
Gas Light and Coke	13,107,332	6 2 3	625
South Metropolitan	3,991,069	4 6 3	450
Commercial	961,304	3 17 11	412

The witness maintained that the Gas Light and Coke Company are seriously over-capitalised, and that to this over-capitalisation is to be traced much of the growing difference between the prices charged for gas north and south of the Thames. Witness further said that the County Council felt that the sliding scale, as it affected the Gas Light and Coke Company, had not fulfilled its object, which was to secure extra care and skill in the management of the undertaking. On the whole, Mr. Haward's evidence was a very able exposition of the case against the Gas Light and Coke Company; but we note one or two weak points, and await with interest the evidence of the gas engineers. We consider, however, that the comparison of the working of one metropolitan company with another is quite legitimate, and are glad that vague growlings and grumblings have at last given place to definite charges. We trust that the Committee will keep in view the growing importance of cheap gas as a substitute for coal, and its consequent value as a means of obtaining a clearer atmosphere.

Victoria Station.

THE preamble of the Bill for the enlargement of Victoria Station has been passed by the Select Committee of the House of Commons, to which it was referred. The fact is noticeable. It emphasises a necessary movement in regard to the structures of the London terminal stations which has long been seen to be inevitable. They require great enlargement. Waterloo, for example, is wholly inadequate for the traffic. Euston, which at one time was regarded as a large station, is now absurdly small. The lighting of it, the want of system, and its crowded state are really a disgrace to the great company which prides itself on being the most up-to-date railway in the United Kingdom. There is sometimes talk of a central London station. Such a station would have to be so large that its erection is an impossibility. But in a few years such stations as those which at present exist at Victoria, Euston, Waterloo, Charing Cross, and Paddington will be noticeably enlarged.

The Alternate Current Arc.

THE discussion on the paper of Messrs. Duddell and Marchant at the Institution of Electrical Engineers was concluded last week. As we expected, it met with a chorus of approval. Several of the speakers, however, seemed to think that the authors had invented the oscillograph. Professor Ayrton, in whose laboratory they had carried out all their experiments, corrected this impression by attributing the invention to M. Blondel. Mr. Duddell has greatly improved its design and in its latest form it is, as Professor Thompson called it, an instrumental triumph. Professor Fleming made some interesting remarks on the remarkable experiments described in the paper, in which one of the carbons was replaced by a metal rod with the result that the alternate current was transformed into a pulsating direct current, the current flowing only when the metal was the positive pole. He pointed out that this experiment threw an interesting light on the mysterious Edison effect in glow lamps, which has never been satisfactorily explained. He agreed with the authors in thinking that the unilateral arc was formed by the metal cooling more rapidly than the carbon. He also showed that the electrolytic theory was supported by the fact that the non-arcing metals zinc, cadmium, mercury, and magnesium were monatomic, and hence if the electric arc were due to the splitting up of the molecules one would naturally expect these metals not to arc. Professor Fleming stated that he had found that the maximum illumination did not coincide with the maximum current in the arc, but followed it by a perceptible interval, and also that as far as luminous efficiency was concerned, a reduction of frequency was very advantageous. Professor Ayrton read extracts from a communication by Mrs. Ayrton, in which she criticised the authors' theory as to the cause of the unilateral arc, and showed how it might arise from the fact that the vapour of the metal was formed at a lower temperature.

Sheffield Society of Architects and Surveyors.

THE annual Report of the Sheffield Society of Architects and Surveyors contains an account of a dispute which they have maintained, in a very firm spirit, with the Secretary of the Sheffield Master Builders' Association. The correspondence throws an interesting light on the claims now made by builders, who seem to aim at a reversal of the old order of things — that they are to command the architect, instead of the architect commanding them. The Master Builders' Association demanded nothing less than the insertion in all contracts of provision for the interference of an arbitrator in every case where there was a difference of opinion between the architect and contractor; in other words, we may say, in every case where the contractor did not find it convenient to himself to obey the architect's directions. The Council "hope that the members of the Society will in no case consent to any such form of agreement." The matter is still under discussion, however, and its further consideration is deferred for the incoming Council. If such a condition were accepted, the architect might as well give up the pretension to direct the building operations at all. The demand is perfectly preposterous.

The Northern Architectural Association.

THE annual Report of the Northern Architectural Association (whose headquarters are at Newcastle-on-Tyne) records an increase in the election of new members over that of last year, and in other respects shows that the Association is prospering and doing good work. The Report includes a letter written by the President of last Session, Mr. F. W. Rich, to the Secretary of the Institute of Architects, in reference to a meeting to be held in Newcastle by the Society of Architects, to discuss the question of the Statutory Registration of Architects. The object of the letter was to explain that the Northern Architectural Association did not intend to take any part in the meeting referred to, but that their abstention was not due to any objection to the principle of registration, but to the feeling that the Institute of Architects was the proper body to promote a scheme of such magnitude. The letter concludes:—

"I am desired, however, to put on record our continued concurrence with the question of registration, and to hope that at some early date the Institute will take up the matter, and so amalgamate the already too scattered architectural societies."

We are rather inclined to think that the Institute is almost pledged to oppose

registration, though we admit that there is something to be said for it from some points of view. But we would ask the Northern Architectural Association, and other bodies who are in favour of registration, to consider how it comes that the Institution of Civil Engineers are able to maintain confidence in their own body without any such method, and why it is that there is no cry for the registration of Civil Engineers. If the principle is right, it ought to be more applicable to the engineering profession than to the architectural, seeing that engineers deal solely with construction, in which it is possible to test proficiency, and not with art, in connexion with which no definite test can be applied.

St. Dunstan's-in-the-West, Fleet-street.

WE read that, subject to the granting of a faculty in that behalf, the rector and churchwardens and the trustees under the Act for rebuilding the church have agreed to sell for 4,500*l.* to the Law Life Assurance Society the open space on the church's west side for an extension of the Society's offices. The old church, of which there are views extant,* was repaired and reroofed in 1701, and escaped from the Great Fire. It was distinguished by a large bracket clock projecting over the pavement, made by Thomas Harris, of Water-lane (now Whitefriars-street), and an alcove with pediment, containing two savages, or wild men, that struck the chimes with their clubs, set up in October, 1671. These were removed by the Marquis of Hertford to his villa, St. Dunstan's, in Regent's Park, now occupied by Lord Aldenham. The new church, built of brick and Ketton stone, was begun in 1831 from the designs of John Shaw, F.R.S., who died on July 30, 1832, aged fifty-six, a few days after the external completion, but before the consecration of the church. His son, John Shaw, architect to Christ Hospital, finished the interior, and also designed the parochial schools and the adjacent offices, No. 187, of the Law Life Assurance Society. The tower and lantern, similar to those at Boston, St. Helen's, York, and St. George's, Ramsgate, by H. E. Kendall (1825), rise to 130 ft.; the body of the church, an octagon with recesses at the sides, has a diameter of 54 ft. in the clear, and the groined ceiling of the clear-story has an enriched key-stone. The roof is supported by eight iron spandrel beams, bound together at the centre with an iron ring. The heads of the label over the south door are considered to be faithful portraits of Tyndale and Dr. Donne; the statue of Queen Elizabeth, at the side, is a relic of Lud Gate. At Richard Marriott's, one of the stationer's shops against the old church, was first published "The Compleat Angler"; of the Izaak Walton memorial window, designed and executed by Messrs. Percy Bacon & Brothers, we gave an illustration on April 13, 1895.

Pictures at Hampton Court Palace.

WE understand that the authorities will transfer to the state-rooms at Kensington Palace, which are now being made ready for the admission of the public, the collection of historical pictures and portraits painted by Benjamin West for George III., which some years ago were hung in Queen Anne's Drawing-room, Hampton Court Palace, on the removal thence of Andrea Mantegna's series, "The Triumph of Julius Cæsar," into Wren's Communication Gallery, in the Fountain Court. The Drawing-room, which measures 41 ft. by 35 ft., and is 30 ft. high, was decorated for Queen Anne by Verrio, who painted the ceiling with an allegorical group of the Queen as Justice, her crown held by Neptune and Britannia, together with Plenty, Peace, &c., and the walls with the British Fleet, Prince George of Denmark, figures representing the four quarters of the globe, and so on. The wall paintings have been damaged by flock paper laid over them, and by the fastenings of the pictures. Amongst West's pictures are "The Death of General Wolfe," "The Death of Epaminondas," "Hannibal Swearing Enmity to Rome," "The Death of Bayard," "Cyrus and the Family of Astyages," and portraits of George III., Queen Charlotte, and their children. It is from this room, where Queen Anne held her drawing-rooms, that one obtains the beautiful view of the Great Fountain Garden, and the converging avenues of the House Park beyond.

* See the illustration (after the drawing by West and Toms, 1737), in the *Builder*, April 25, 1885; the "Mirror," 1739; and later views by Maurer, Malton, Miller, &c.

An Impressionist Exhibition, Paris.

AT the Durand Ruel Gallery at Paris a small exhibition has been organised of the works of Impressionist painters, including pictures by Claude Monet, Pissaro, Renoir, and Sisley. It is a more important collection than the similar ones which have preceded it. Monet is represented by thirty-six pictures, of which those known as "Le Champ d'Avoine" and "Les Peupliers du Bord de l'Epte" may be called the curious visions of a colourist. The works of Renoir are almost all *genre* paintings of a very heavy and disagreeable tonality, but fine in drawing. Pissaro is represented by thirty-five paintings, the older of which betray much of the influence of Courbet. The works of Sisley show an unquestionable mastery over effects of light, especially those of later date. Nevertheless it must be confessed that the collection as a whole leaves the impression of a great deal of violent and exaggerated effect in colour, and is not restful either to the mind or the eye.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

ANNUAL REPORT.

THE Annual General Meeting of this Institute was held on Monday at No. 9, Conduit-street, Regent-street, Mr. E. A. Gruning, Vice-President, in the chair.

The decease was announced of Herr Von Egle, Hon. Corr. Member, of Stuttgart.

The Spring Statutory Examination.

It was stated that, pursuant to Section 140 of the London Building Act, 1894, an examination of candidates for certificates of competency to act as district surveyor in London was held by the Institute on the 20th and 21st ult. Of the five gentlemen who presented themselves and were examined, four passed and have been granted by the Council certificates of competency. They are as follows:—H. D. Eldridge, of Sandycoombe, East Twickenham; H. Hoyne Fox, Streatham Hill, S.W.; H. G. Leslie, Putney; C. W. Surrey, South Kensington.

The annual Report of the Council, which was adopted, contained the following passages:—

"Since the publication of the last annual Report, on May 7, 1898, twenty meetings of the Council have been held, of which the Council, elected on June 6, 1898, have held seventeen. These are exclusive of meetings held by Committees of Council. In the course of the year twenty-five Fellows have been elected, thirty-one Associates, one Hon. Fellow, one Hon. Associate, and one Hon. Corr. Member. Of the twenty-five Fellows, eleven have been elected by the Council under the new proviso to By-law 9, six being Presidents of allied societies, and five having been unanimously recommended by the Councils of allied societies. The numbers in each class of subscribing members stands as follows: Fellows, 612; Associates, 1,003; Hon Associates, 47. The only gentleman elected as Hon. Corr. Member is the Professor Felice Barnabei (Rome). The losses by death to the Institute during the past year have been as follows:—Fellows: Henry Bridgford, Henry Hewett Bridgman, Thomas Lainson, Professor Thomas Hayter Lewis, Thomas Rowe, John Gibbons Sankey, Sydney Stent. Associates: Hayward Richardson Brakspear, Edmond Egan, Sidney Alexander Ell, Charles Emanuel Evans, John Gillett Livesay, Frederick Mew, George Macfie Poole, William Reddall, Tom Turner. Hon. Associates: Sir John Fowler, Major Alfred Heales, George Andrew Spottiswoode, Judge Meadows White. Hon. Fellow: Sir Henry William Peek. Retired Fellow: James Murray. Hon. Corr. Member: Charles Garnier (Paris). In Professor T. Hayter Lewis the Council mourn an old and distinguished member. A serious loss to European architecture is that of Charles Garnier, a Royal Gold Medallist of the Institute. The Council have subscribed to the monument now being erected in Paris to his memory.

Preliminary and Intermediate examinations were held in June and November, 1898, in London, Birmingham, Bristol, Manchester, and York, and final examinations in London. The results are shown in the following tabulated forms:—

Preliminary Examinations.

	Exempted.	Examined.	Passed.	Relegated.
Summer...	40	92	58	34
Autumn...	52	78	46	32
Total	92	170	104	66

Intermediate Examination.

	Examined.	Passed.	Relegated.
Summer.....	76	53	23
Autumn.....	48	32	16
Total	124	85	39

Final and Special Examinations.

	Examined.	Passed.	Relegated.
Summer.....	30	15	15
Autumn.....	33	16	17
Total	63	31	32

It will be seen that during the year 196 gentlemen have been registered as Probationers, the number of whom now stands at 1,098; and eighty-five as Students, the number of whom now stands at 303. . . .

The annual dinner this year will be held on Tuesday, June 27, in London, at the Whitehall Rooms, Hôtel Métropole.

The sanction of the Privy Council to the alterations in By-laws 9, 15, 30, and 31 was given at the Council Chamber, Whitehall, on May 19.

The revised schedule of professional charges, entitled 'The Professional Practice as to the Charges of Architects,' was finally agreed upon and adopted at a special general meeting of the Institute held on June 27.

Since the issue of the last annual Report the Aberdeen Society of Architects has been admitted to alliance with the Royal Institute.

The Council have taken public action with regard to the New Vauxhall Bridge and the London Government Bill.

The Council, having been requested by the Government to recommend a limited number of architects from whom two might be selected to prepare designs for the New Government Buildings, have been officially thanked for their services, and informed that Mr. J. M. Brydon and Mr. William Young are the architects chosen.

The Competitions Committee have had several meetings, and action has been taken with regard to the following competitions:—International Fisheries Exhibition, Aberdeen; Glasgow International Exhibition; Royal Institution, Liverpool; Tavistock-road, Plymouth; Fire Station, Bradford; Wolverhampton Workhouse; Godalming Municipal Buildings; Swindon Union Workhouse extension; Grammar School-house, Doncaster; Wandsworth and Clapham Union.

Special Committees of the Institute are a present sitting to consider respectively the following subjects: The holding of the Institute

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examinations in the Colonies; proposals by the Association of Technical Institutions that certain certificates of the Science and Art Department should exempt from portions of the Preliminary and Intermediate examinations; the administration of building by-laws in rural districts. . . . .

At the request of the Court of Common Council of the City of London, the Council have nominated six architects to send in designs for the new Sessions House, Old Bailey.

The Council are pleased to announce that since December 31 they have been enabled to invest 1,500*l.* in Tasmanian Government 3½ per cent. stock.

Report of the Art Standing Committee.

The Art Standing Committee report that they have held seven meetings since the publication of the last report. Mr. Alfred Waterhouse, R.A., LL.D., was re-elected Chairman; Mr. Macvicar Anderson, Vice-Chairman; and Messrs. E. W. Mountford and Owen Fleming were reappointed Hon. Secretaries.

St. Patrick's Cathedral, Dublin.—Plans and particulars of proposed additions to St. Patrick's Cathedral, Dublin, were submitted to your Committee, who were asked to state (*a*) whether the addition of modern building to the Cathedral was legitimate and reasonable; (*b*) whether the plan submitted was sufficiently conservative and considerate towards the original plan of the thirteenth century. Your Committee (*a*) determined that, assuming additional accommodation to be necessary for the efficient performance of the services of the Cathedral, it would be legitimate and reasonable to provide it; but (*b*) suggested a modification in the proposed grouping of the buildings.

Kew Bridge.—Your Committee, having had this matter under their consideration, urgently recommended the adoption of granite or stone as the material for the bridge, and by the instructions of the Council, the Secretary wrote to the County Councils of Middlesex and Surrey conveying this recommendation. In reply the Institute was informed that stone would be used.

Vauxhall Bridge.—This subject has received further consideration, and, as the result of some correspondence between the Secretary of the Institute and the Chairman of the London County Council, the Chairman (Mr. Waterhouse, R.A.), with Messrs. Statham and Mountford (Hon. Secretary), waited upon the Chairman of the London County Council and stated their views as to the design prepared by Sir Alexander Binnie.

Historic Buildings in London.—At the invitation of the London County Council your Committee invited Messrs. Brydon, Mountford, and Young to represent the Institute at a conference held by the Council. The conference determined to prepare a register of all buildings of architectural or historic interest in the County of London, and a Committee was appointed, of which the Hon. Secretary of the Committee is a member.

Florentine Monuments.—The attention of your Committee having been directed to extensive alterations that appeared to be contemplated in the ancient quarters of Florence, steps were taken to assist the English committee who had been appointed to deal with this matter. Signatures were obtained from members of the Institute and its allied societies to a memorial of protest, which has been presented to the Municipality of Florence.

Artistic Copyright.—Your committee have had under consideration the questions of artistic copyright, and Messrs. Statham and Caröe were appointed to represent the Institute at the conference.

Decoration of St. Paul's Cathedral.—This matter is engaging the attention of your committee.

The following subjects have also received the consideration of the committee:—Portrait of Sir William Chambers; Trinity College, Dublin; the Casino at Mont Saint-Michel; the Protestant Cemetery at Rome; the Kapell-Brücke, Lucerne; and the proposed Arts and Crafts Exhibition."

The report of the Literature Standing Committee mentioned that since the election of the Committee on June 6, 1898, the Committee have held eight meetings. At the first meeting of the new Committee Mr. Alex. Graham, F.S.A., was reappointed chairman; Mr. R. Phenè Spiers, F.S.A., vice-chairman; and Messrs. R. Elsey Smith and Arthur S. Flower, M.A., hon. secretaries. . . .

"The Librarian has now completed the Supplement to the Brandon Catalogue up to the end of the year 1898. The catalogue is in type, and will shortly be issued to members. It will occupy about 100 pages of printed matter, and the Committee desire to take this opportunity of expressing their appreciation of the promptness and care with which this important work has been carried out by the Librarian.

The Committee have to report the satisfaction with which they have received from the family of the late Professor T. Hayter Lewis a valuable collection of books and pamphlets for the library."

The Practice Standing Committee report that the usual monthly meetings of the Committee have been held. Mr. J. Douglass Mathews and Mr. Thomas Harris were re-elected chairman and vice-chairman respectively; Mr. J. Osborne Smith and Mr. C. H. Brodie were elected hon. secretaries, Mr. Smith taking the place of Mr. Woodthorpe, who resigned.

"The points raised on the Institute conditions of contract referred to in the last report, and also other important questions on these conditions, referred to the Committee by the Council, were very fully considered, and reports thereon sent to the Council, special attention being called to the decision in the Court of Appeal in the case of Dodd *v.* Churton (March 19, 1897) as affecting all contracts. The Lords Justices decided that the giving of extra work nullified the time for completion clause and consequent fine for non-completion.

A report was also sent to the Council on the question of the liability of architects for license as appraisers, intimating that, in the opinion of the Committee, they are not in ordinary practice liable to this tax.

The consideration of the revised schedule as to the professional charges to be made by architects was continued and concluded, and the proposed new schedule sent to the Council. After amendment by the Council, assisted by the chairman and vice-chairman of the Committee, this was finally ordered to be issued as an Institute paper at a special general meeting on June 27, 1898. The schedule, as finally amended and adopted and issued, was printed in the *Journal* of July 23, 1898.

At the request of the Committee the Council have agreed to obtain counsel's opinion as to the liability of architects under the new Workmen's Compensation Act, and a list of questions to be submitted to counsel was drawn up by the Committee.

A suggestion that the Committee should be allowed to interview and advise members of the Institute as to difficulties arising in their practice was not agreed to by the Council, on the ground that this work was already undertaken by one of their own committees.

The Committee have considered the London Government Bill and reported thereon to the Council."

The Science Standing Committee report that they have held six meetings since the publication of the last annual report, with an average attendance of eight members. Mr. P. Gordon Smith was appointed chairman; Mr. W. C. Street, vice-chairman; and Mr. H. D. Searles-Wood and Mr. Max. Clarke, hon. secretaries.

"The Committee are still awaiting the publication of the results of the experiments for the purpose of ascertaining the strength of different kinds of brickwork.

The Committee, having reported to the Council on the subject of standardising the size of bricks to the effect that they should like the matter referred back to the Committee with a view to coming to an agreement with the Brickmakers' Association to fix the standard, appointed a sub-committee to meet a sub-committee appointed by the Institution of Civil Engineers, and a joint standard was agreed to by the joint committee and referred to the Association for discussion. The joint committee have not been able to meet to consider the replies of the Association, owing to the absence from England of one of the members of the engineers' sub-committee, but it is hoped that the standard will be agreed on in the course of a few months."

The accounts of ordinary funds for 1898, prepared by Messrs. Saffery, Sons, & Co., chartered accountants, and audited by Mr. Zeph. King and Mr. F. W. Marks, the hon. auditors appointed at the annual general meeting of 1898, conclude the Report.

Scrutineers were then appointed to direct the election of Council and Standing Committees for the ensuing year of office.

A vote of thanks was accorded to Messrs. Zeph. King and F. W. Marks for their services as auditors.

The Statutory Board of Examiners.

The chairman announced the resignation from the board of Mr. Francis Chambers. Mr. Thomas Blashill was appointed to fill the vacancy.

The chairman announced that the next meeting will be held on the 15th inst., when Mr. H. H. Statham will read a paper on "The Architectural Element in Engineering Work."

THE ARCHITECTURAL ASSOCIATION:

SPECIFICATIONS.

AN ordinary fortnightly meeting of this Association was held on Friday, last week, in the Meeting Room of the Royal Institute of British Architects, No. 9, Conduit-street, Regent-street, Mr. G. H. Fellowes Prynne, President, in the chair.

The minutes of last meeting having been read and confirmed, it was announced that Mr. A. E. Nightingale had been reinstated a member of the Association.

On the motion of Mr. E. Howley Sim, senior honorary secretary, a hearty vote of thanks was accorded to Messrs. G. B. Carvill, Gervase Bailey, and Leonard Butler for their efforts *re* the annual soirée. A vote of thanks was also passed to the ladies and other members of the cast who so ably assisted on the occasion.

Mr. Sim also proposed a vote of thanks, which was agreed to, to the Prime Warden of the Fishmongers' Company for allowing members to visit the Fishmongers' Hall on April 15, and to Messrs. H. Chatfeild Clarke and J. D. Crace for conducting the party over the Hall.

The intended visit, on the 6th inst., to the Building Trades Exhibition, at 3 p.m., was also announced.

The Chairman announced that the first meeting of the Sketching and Measuring Class would be held on May 2 at South Kensington Museum (Architectural Court).

He also stated, *re* the House List for 1899-1900,* that Mr. E. W. M. Wonnacott had been nominated by Messrs. Stonhold and Freeman as honorary librarian.

Messrs. W. A. Jeckells, A. Smithers, and W. A. Webb were appointed scrutineers in the forthcoming election of officers for the new session.

The following paper on "Specifications," by Mr. F. W. Macey, was then read by Mr. G. B. Carvill, junior hon. secretary, in the author's unavoidable absence:—

There has been so much recently written upon the subject of specifications, that it is difficult to suggest any new or original ideas, and I fear that the few remarks I have to make may be somewhat wearisome to many present, and seem like going over old ground.

But those who have not given the subject any special consideration may find some of the suggestions not wholly unprofitable.

And if further excuse is necessary, I do think that to hear a question discussed creates a more lasting impression than that of mere reading.

A specification may be either lengthy or curtailed, according to the particulars given upon the drawings. Some engineers favour a short specification and prefer to put as much written information as possible upon the drawings, one reason for this being that engineers usually supply a number of detail drawings with their contract plans, which enables them to put many notes upon those drawings. On the other hand, architects do not usually supply many detail drawings, consequently somewhat lengthy specifications are necessary.

To my mind, either method may be adopted if the requisite information be clearly given.

I can conceive of a set of plans prepared and written up so fully in detail that a specification as a separate document might become unnecessary; this sometimes happens in a certain class of work. On the other hand, I can scarcely imagine a specification so full in detail as to dispense altogether with the plans, unless it related to a very small and simple erection or to general repairs or decorations.

But without further discussing these two methods I would ask you to assume that both

* For list of names see our issue for April 22.

plans and the specification are necessary for general work; I will then suggest a form of specification which shall be curtailed and yet shall not detract from a full and clear description of all parts of the work.

A specification should not supersede the particulars given upon the drawings, but should more fully explain those parts which the drawings do not clearly illustrate, or which are in any way obscure. It is impossible to show every detail or give every particular upon the drawings, consequently a full description of those parts becomes absolutely essential in the specification.

I take it that the plans give the general arrangement of the building, and the specification should describe the details of that arrangement. The plans should have figured upon them every important dimension, such as the lengths, widths, and heights of the various distinct parts of the building; the thickness of walls; the depth and width of the concrete foundations; the sizes of floor joists, roof, and flat timbers; the widths and heights of doors and windows; and all other similar and important parts and items. It is seldom that plans to a small scale are so accurately drawn as not sometimes to be obscure with regard to the sizes of certain parts unless these parts are given in figures.

The only other particulars in writing to be put on the plans would be the names of the rooms and other parts of the building, together with any notes or references which might assist the description in the specification.

With regard to small scale drawings, do not labour the elevations by showing every brick and slate. Working drawings will be far clearer without too many lines, and there is no need to finish them like a picture.

But in the specification I would include everything except the general dimensions of the various parts of the building. Of course, the sizes of the joists and roof-timbers are always described in the specification, as well as sometimes being given on the plans; and I see no harm in stating the thickness of the various walls, the depth and width of the concrete under the walls, or any other detail of the building. A specification which is full but at the same time concise and to the point will prevent mistakes and misunderstandings when the building is in progress. Need I remark that the specification should always agree with the drawings?

Presuming, then, that the plans are before you, but not in too great detail, and that you have decided to write a rather full specification—what, then, is the first consideration?

You must have a complete knowledge of your subject—that is, a full grasp of the details of building construction and of the value and properties of materials. In other words, you must know what you want to describe, and, knowing that, you must be acquainted with the requirements attendant upon those wants; and you may take it for granted that until you are proficient in these matters you will never be able to commit to writing the proper descriptions needful to the erection of a building.

Therefore, I say that a complete knowledge of all the requirements and details of the various trades coming within the scope of the architectural profession is the first consideration to efficient specification writing; and I might also add a knowledge of the various Acts relating to buildings. But it may be said that it is impossible to know everything, and when in doubt the only way is to put a provisional amount to cover any such point, and to obtain afterwards the information from a friend or specialist. This is true, and may be the only course to adopt at the time, but ready and accurate knowledge will benefit all parties concerned. The question then arises: What is the best way to obtain such knowledge?

I know of only two ways, study and observation. What I do myself is first to read any works obtainable which bear upon any doubtful point, and I would also add that much useful information can sometimes be gained from trade catalogues. I then discuss the matter on every possible occasion with any one I come across who has any knowledge of the subject, and, further, I keep my eyes open and learn all I can from what is going on around me. You have only to pass down any street where building operations are in progress to gain many practical hints.

You now proceed to write the draft specification. This is often hurriedly written, much being left to alter and supplement when revising for fair copying. This is a great mistake. A draft specification should be written with care and thought. Being fresh to the matter, even so dry a subject creates a certain amount of interest, and if you concentrate your mind upon the subject you will be less liable to omit many small items. Therefore, let the first draft be as complete as possible.

I might suggest that when engaged upon the plans, it will be found of great assistance if notes are made of any obscure item coming under your observation at that time.

Just a reminder here. When sending out a number of fair copies, see that they all agree.

There is one matter which I should perhaps have referred to sooner. Should the quantity surveyor write the specification for the architect? In the abstract it seems absurd to ask such a question were not this practice so frequently followed. Personally, I think the architect should write his own specification, and not delegate the work to another. A quantity surveyor cannot know what is in the architect's mind, therefore it is impossible for him to describe fairly that which embodies the architect's best ideas. It is unjust to the quantity surveyor to ask him to attempt to do so. It is also unjust to the client, and the architect has no right to accept payment for work done by another. One other word with reference to the quantity surveyor.

When he takes out the quantities it is usual for him to make notes of any omitted items on the architect's specification. Should he not do so, however, the architect must run through the bills of quantities and adjust the specification to them before the contract is signed.

Reverting to the subject-matter, a full specification will save many an anxious moment. Constant disputes occur with the builder, many extras crop up owing to imperfect wording and omissions—ordinary care would prevent all this. And remember always that a specification is a legal document.

Bearing somewhat on this incomplete description of work, attention might be called to the fact that one so often sees in a specification wording to this effect:—"That the builder is required to perform a certain work all complete," or "all as required," or "as necessary." This generalising shows the architect's ignorance of what is required; and it is not reasonable to ask a man to estimate for something of which you yourself do not know the requirements. Consequently you either get an unfair estimate or an incomplete work, or else a squabble ensues with the builder as to what was intended or required. Should you ever be in this difficulty of not knowing what is necessary, then the best plan is to put a provisional amount and let the item work itself out in execution. Therefore let your terms be definite and clear. Some make a great point as to which is the correct word to use, "provide" or "supply." I think it very unimportant. There certainly is a slight difference; but, at the same time, to provide you must supply, and to supply you must provide.

Agreeing, then, upon this point that a specification must be somewhat full, and, consequently, lengthy, what then is the best way to curtail the descriptions without detracting from the merits of the document? There are several ways. Many items which will apply to several parts of the building under similar conditions may be generalised. Thus, take, for example, the skirtings to a building. A general clause applicable to all skirtings may be inserted, somewhat to this effect: All skirtings to be rebated to floors, tongued and mitred at angles, tongued at heading joints, housed into architraves, returned and mitred at ends, and fixed to double splayed narrow-framed grounds with dovetailed backings and filling out blocks, and plugged to walls.

The only further description then necessary will be to refer to each particular skirting, such as:—

Attic skirtings 7 in. by 1 in. plain deal.
First-floor skirtings 9 in. by 1¼ in. moulded deal.

And so on.

Here, then, the description of the fixings to each separate class of skirtings is avoided. In the same way the backings to door and window linings, and many other items where the conditions are similar may be generalised.

Further, if any detail drawings are supplied with the contract plans, which I fear is not often the case, a specification may be much shortened without detracting from its efficiency by merely referring to the detail drawings in question, and at the same time mentioning any particular feature not readily gathered from those drawings.

Thus, in about three lines, may be stated all that is necessary, which otherwise would perhaps occupy a dozen or twenty. But I fear, until it is the custom to supply detail drawings with the contract plans, very much cannot be made of this point.

Here is another way to shorten a specification. Take, for example, the windows to a building, one or two of which are dissimilar from the rest. I would first describe those, and then refer to all the others on all floors, in all positions, in the one item, and not describe them to each floor separately. Take, again, the external facings to brickwork. Describe any special facing first, and then the whole of the other facings to all parts in the one item without reference to special position There are many other items which may be treated in this manner. One more suggestion. The wording itself of a specification may be much curtailed by care and practice. You will never be able to write concisely and to the point until you have written many specifications.

Do not labour the wording needlessly nor repeat yourself unnecessarily. In time the requisite language will come simply and quickly.

I want it to be understood that my remarks chiefly apply to the correct form and wording of a specification of which quantities do not form a part of the contract, or which, perhaps, have not even been supplied.

Another important point in a specification is that it should be readily understood and clear. To avoid confusion tabulate as much as possible the various parts of a complete item of work by placing each separate particular under the preceding one. It will take more paper, but then that is always a good fault, for it will make the description clear at a glance. The form of tabulation I would suggest is as follows, which illustrates the description of a roof formed with trusses.

The roof to be formed of, say, six whole trusses and two half trusses, each to be placed 10 ft. apart, and composed of the following scantlings, and the whole notched, framed, spiked, and strapped together:—

Tie beams 12 in. by 6 in., resting on 2 ft. 6 in. by 12 in. by 3 in. tooled York templates.
King posts out of 6 in. by 5 in.
Principal rafters 6 in. by 4 in.
Struts ... ... 4½ in. by 4 in.

and so on. Here it will be noticed that each separate component part of the roof is placed immediately under the preceding one until all the items have been described. Thus, at a moment, the sizes and particulars of any one special part of the roof may be seen.

This form of tabulation will be found much clearer than the method which is so often adopted of running on the particulars of the various items line after line without a break. In the same way may be tabulated the descriptions of floors, windows, doors, and many other distinct items severally composed of many parts.

As another aid to the clearness of a specification, divide the descriptions into many clauses, and do not make the clauses too long, nor omit an occasional full stop. Also keep the clauses well apart, and do not crowd them together; any item will then be quickly seen, and you will not have to question to which part of the building a description belongs.

Conceding this point that a specification should be perfectly clear at a glance, a further question arises: Should the work be divided into separate trade headings? As a general principle this is unavoidable, and I think desirable, but I would also say, without hesitation, that very many distinct items of work would be clearer and more comprehensible if the various trades relating to them were not separated, but the complete item of work described under the one heading, placed in whichever part of the specification seemed most desirable. Thus, to illustrate:—

Take an iron casement window, with wood frame, linings, and the usual glass and fittings. Ordinarily this would come under several trades; but I would describe everything connected with that window under the one heading of, say, joiner—that is, the iron casement, the wood frame, linings, shutters, and finishings, the ironmongery, and glass, and with, perhaps, a cross reference in smith, stating that the iron casements are described in joiner. The builder will see at a glance all the requirements of that window, and the client, if he peruse the speci-

fication, will also have an idea how it will look when finished. Another example: Take an iron girder. I would describe under smith and founder the girder itself, the templates, cover stone, any cement packing, felt or lead seating, and the painting. Perhaps it might be better to generalise the painting under painter in the one description applicable to all girders and covered up ironwork, and in that case a reference should be put under smith and founder. There will then be no excuse for the painting to this work escaping the builder's attention.

When describing the work to small alterations, repairs, or decorations, it is almost essential to adopt this order of running on the description, regardless of trade headings and formalities. Of course, when work is let to separate tradesmen you cannot adopt this method.

A building contract, which is often referred to in a general way as the specification, is understood to include the conditions of contract, the form of contract—that is, the actual agreement; and the specification of the subject matter embraced in the contract. The conditions of contract and the form of contract should only embody, so to speak, the actual legal requirements which, taken by themselves, do not affect the description and value of the work and materials. These strictly legal clauses I do not propose to touch upon.

But it will often be found in many specifications that under the leading conditions of contract are placed many clauses which do actually affect the amount of the estimate. This, I think, is a mistake, for at the time of tendering, a builder so often only hurriedly scans the conditions of contract, and when reading them over again, preparatory to signing the contract, may, unfortunately, find there are several items included which he has omitted to price in his estimate. The client does not always see his point, and the builder either has to bear the loss or throw up the work. This remark chiefly applies to a work for which no bills of quantities have been prepared.

But that part of the contract, or, in other words, the specification itself, of the actual work and material, should embody every item which may in any way affect the estimate: therefore, under the General Clauses, or Preliminary Items, as they are often called, I would include the following matters which are so often to be found only under the Conditions of Contract:—

The date of completion—this requirement may necessitate an extra allowance for overtime or other special employment of labour;

The mode of payment—under certain conditions the builder may require to borrow money to enable him to carry on the work between the times allotted for payment;

Keeping the work in repair for a stated period after completion—this may necessitate an allowance to cover any matter which may crop up under this item;

The insurance fees and fees to any authority should also be included under this heading of Preliminary Items, as also any other matter not coming under a trade heading which may possibly require a price.

Just a hint as to the outside cover of a specification. Put as a reminder in red ink a note of the insurance and date of completion. One is apt to forget these matters.

Then as to the marginal references. It will be found a great convenience to all parties if a marginal note is given to each distinct item of work. It will then be seen at a glance where a "bath casing" is placed, or the "spandrel framing to a staircase," instead of having to wade through pages of other subject matter. In addition to the marginal notes, I would put all the principal items under sub-headings, so to speak, in their respective trades. Such as all wood staircases under a sub-heading of "Staircases" in Carpenter and Joiner; similarly all casement windows under a sub-heading of "Casement Windows," and all other such divisions of work. And when you come to the many minor items which only require a separate clause to each, these might be put under the one sub-heading "Other Items" or "Other Fittings." These sub-headings should be written across the page.

As to numbering the clauses. This, I think, very important. It will be found of great assistance to be able to refer to the number of a clause in a letter when calling the builder's attention to any special part of the work, as also in the case of cross-references when referring from one part of the specification to another. Each separate clause need not necessarily be numbered, but only each distinct item of work which may embrace several clauses.

As to marginal sketches to illustrate rather involved parts of the specification, I think in many cases these will be found very useful. I would then suggest that the lithographer take them direct from the architect's sketches. If the specification is typewritten or fair copied in the office, then either do all the sketches yourself or else see for yourself that they are copied correctly.

Where should provisional amounts and prime cost items come in a specification? Should each amount come under the trade in question to which it refers, or should they all in a body be put together? I think no hard and fast rule can be applied to this, but small provisional amounts should run on with the subject-matter to which they refer; and distinct and perhaps more costly provisional amounts, and of which there may be no other description in connexion, should be all placed together under the one heading "Provisional Amounts," either immediately following the preliminary items or else at the end of the specification.

The general run of "Prime Cost Items" usually apply more to small matters, and these, I think, should follow the items to which they refer. But if of any considerable amount I would then put them also under the heading "Provisional Amounts."

Should a specification have an index similar to that provided with a technical or scientific work? I think this would be very useful, and it certainly would make a specification a more complete and handy document. The index need only refer to the principal items.

Sometimes it is difficult in a specification to locate the description of a particular part when there is no distinct mark or name on the drawing. Some employ the points of the compass; this is very well if they will apply, but when you get a position perhaps centrally situated, it rather fails in its object. I prefer in such cases to put a number or a letter, and that perhaps in a circle, against the part in question, and so refer to it in the specification. Many of these references will not be required, as the drawings will generally be sufficiently clear to locate the descriptions by referring to the ordinary parts of the building by name or position.

Should an old specification be referred to when describing the work relating to another building? I think only so far as the general clauses are concerned, such as those under the preliminary items, the preambles to the various trades, and the other general covering clauses under those trades. But the details of the work I would write entirely in the first place without any reference whatever to a former specification. All detail descriptions cannot be exactly alike, and you will be far more likely to put in any necessary variation of the detail in question if you think it out as you go along, than if you copy an old description and alter it afterwards to suit, because when you copy an item you cannot properly be thinking out the details yourself.

To obviate omitting, so to speak, any of the general items common to all work, have by your side a form or tabulated index of the items coming under the various trades. This can be looked down at a glance and all the items extracted which may be required.

There is one word in a specification of which the meaning is often disputed. It is the word "best" when applied to workmanship and materials, especially to materials, and is, I grant, somewhat ambiguous. But I would not use such terms as "best finest," "extra best," "super best," "best best," and so on, but merely employ the word best once and for all, and attempt to define its meaning.

Here is a suggested definition of this word:—The word "best," as applied to materials, articles, and workmanship shall mean that there is no superior quality of material or finish of article in the market, and no better class of workmanship obtainable.

In fact, by defining this word "best," it will only be necessary to mention it in the one clause when stating that all materials and workmanship are to be of the best quality and class.

We are all apt to fall into the error of describing certain materials mechanically, such as timber from a market which has long since been entirely exhausted, or stone from a worked-out quarry, or we use misleading and exaggerated language, "timber free from knots," demanding what, in our own minds, we never expect to obtain. We should only specify what we can get, what we mean to have, and then see that we get it.

At the same time we must not lose sight of the fact that our endeavour must be to obtain the most suitable and best material procurable in the market and that the work when executed shall be a credit to all.

As to the question of sub-contracts, this, I fear, would take some time to discuss, but, as a general rule, let a sub-contract go through the general contractor; but when this is impossible then make the sub-contractor subject to all the conditions of the main contract equally with the general contractor, and in the main contract stipulate that the general contractor is to give every facility to the sub-contractor and allow him the use of his scaffolding and plant.

Having now, so far, settled the general scope and bearing of a specification, the next step is to put the various items into order and place. As I have before said, we cannot do better, generally, than divide the specification into separate headings or trades as they are called. As to the order in which these trades should be placed, I do not think that very important, only let each trade, if possible, come in the order in which the building would be erected.

Thus the specification would be started with the preliminary items or general clauses, under which heading would come every item that would apply to the building generally as a whole. Then would follow the trade of excavator, this being the first start of the actual work. Then the trades embracing the structural parts of the building, such as bricklayer or mason, whichever trade would chiefly apply to the walls. In like manner you would go on constructing the building on paper until it was roofed in, when the trades taking the interior fittings, finishings, and requirements would follow, and finally the decoration and painting.

As to what items each particular trade should embrace, or how many trades the specification should be divided into, that to some extent would be a matter of convenience and clearness, consequent on the nature of the building in question. Thus, if pavior is a considerable item, make it a separate trade, but if a very minor point then the paving may come under the trade of bricklayer. Again, if the drainage is a large item, I would make that a distinct trade, instead of putting it as it is often done, under excavator. Further, floor and wall tiling might either come under pavior, bricklayer or plasterer, as each of these trades, in certain parts of the country, is performed by the same class of workmen. Many other items may be treated in the same manner.

Each trade is started with a preamble or the general clauses mostly applicable to all the items under that trade, such as the description of the various materials, and the general covering clauses referring to similar parts of the work in different positions; after which follow in detail the actual items of work. Strictly speaking, a preamble is an introduction or preface, but in a specification the term is applied in the sense of denoting the general clauses and descriptions at the beginning of each trade.

Going more fully into the various items of almost similar description under each trade, I think the best plan, in most cases, is to describe all the items of a similar nature to each floor separately, from the lowest to the topmost story, continuing with other similar items on each floor. But if the description of any item will apply equally over the whole of the building, describe it so, without reference to each separate floor, and thus save useless repetition. As to the exact order of the various items under each trade, I would put them as far as possible in that order in which they would be built. But there is no hard and fast rule to follow in this respect, as in many cases it will be clearer to run them on, regardless of that order.

When describing the items do not omit to mention the class of material, thus state the particular quarry and bed of stone, give the class of wood for the timber and joinery work, and state whether it is rough or wrot. A general clause, such as this, "that all exposed faces of timber and joinery work except where otherwise mentioned are to be wrot," will save repetition of this word "wrot."

State if you mean Portland or other kind of cement; the word Portland is often omitted.

And all other descriptions of materials should be clearly defined.

Reverting once more to what is considered the best order in which to place the items of

work under the various trades, I know that this is one of the chief difficulties of the beginner, and I will suggest an arrangement for some of the principal items. I have before mentioned that, as a rule, it is best to specify the items in that order in which the work will be built, but that it is not always possible to carry out that order. But I would say that whatever order you once adopt, always follow in all your specifications and in all its parts, so that you will know yourself where to find an item.

I have also said that each trade in every case should start with a preamble, or the general clauses and description of materials.

Now to take the principal items under the various trades respectively.

In *Preliminary Items.*—I do not think any particular order is essential, but it would be as well to keep the clauses in that order which would mostly run with the order of the work to the building. If old buildings have to be removed, the description would come under this heading of preliminary items. But if a housebreaker is employed then this work would form a separate and distinct contract by itself.

In *Excavator* take the surface excavation first, then the deep excavation, such as that to basements and cellars ; then the general excavation to the foundations and the attendant items, such as planking and strutting, filling and ramming ; and finally any other small or particular items. Then describe the concrete foundations, after which the surface concrete and any brick rubbish under, then the concrete floors, roof, and stairs. If the walls of a building are in concrete I would take these immediately after the concrete foundations, of which they then would almost form a part.

Under drainage describe the manholes first, then the pipes with the concrete, then the gullies and other similar items.

The items under the trade of pavior are so simple that any order might serve, but take first the important items of internal paving, and follow on with the smaller items, and finish with the external paving.

In *Bricklayer* commence with the general walls of the building, then the damp-course, hoop iron, and other attendant items. Then those parts in cement, such as rough arches, trimmer arches, piers, sleeper walls, half-brick walls, and dry areas. Then the external facings and pointing, gauged or other external arches, dressings, mouldings and ornaments, external glazed brickwork, or flint facings. Then the internal facings and pointing, glazed brickwork, and wall tiling. Boundary and retaining walls and such-like distinct items should come last, and be described separately and completely by themselves. Terra-cotta facings might either come with the other external facings or be kept as an item by itself after the description of the other general work, and before such items as boundary or other walling.

In *Mason* commence with the rough stone such as templates and corbels, if not elsewhere described, and follow on with the thresholds, sills, copings, internal pavings, staircases, hearths, and chimney-pieces. Then the external paving, steps, and curbs. If the walls are built or faced in stone I would describe these first completely, with all the labours, mouldings, and ornaments on them, and then follow on with the rough stones and internal items, and finally with the external items, such as paving, steps, and curbs. I would not trouble to keep all stone of a similar nature under the one heading, unless it should happen to come in that order.

Many make carpenter and joiner two trades. In a large work perhaps it is better to separate them, but in a small work I should certainly keep them together. But it is immaterial whether they are separated or not as long as the descriptions are clear. Personally, I prefer them generally under one heading ; you will perceive the reason from the order of the items I will now give you under these trades.

Lintels, bressummers, posts, cradling, floor and ceiling joists and plates, sound boarding roof or flat timbers, felt, battens, gutters, and all external joiners' work to the roof or flats, except windows, doors, and skylights, such as rolls, fascias, barge-boards, and such-like items.

Then would come quartered partitions, followed on with flooring, windows, skylights, external doors, internal doors, framed partitions, skirtings, dadoes, wall and ceiling panelling, staircases, sinks, water-closets and bath casings, and other internal fittings, such as shelves, cupboards, and such-like domestic fittings.

Fencing, weather-boarding, or other outside work should be complete items by themselves, and come last.

Half-timber work, with all its attendant items, might, I think, come after the description of the rough timbers.

I would not separate hard woods from soft woods, but describe them as they come on each separate story.

In Smith and Founder take this order, lintols, chimney bars, straps, girders, floors, columns, roofs, carriages, iron windows, gutters, stack pipes, external railings and gratings, stoves and ranges and heating. Heating may come under heating engineer.

Under Slater and Tiler, roofs first, then vertical slating or tiling, shelves, cisterns, and such like smaller items.

In Plumber take gutters, flashings, and other roof finishings, flats and their gutters and finishings, then drinking water supply pipes, cisterns, sinks, lavatories, baths, and fittings. Then water-closet supply pipes, cisterns, water-closets, slop sinks, urinals and fittings, soil and ventilating pipes, hot water circulation.

Zincworker and Coppersmith. — Take flats, gutters, and finishings, pipes, lightning conductors.

In Plasterer describe first the general plaster work to ceilings, partitions, and walls, then follow with cornices, coves, centre flowers. Then those parts in cement, and, finally, the external plaster or cement work, or if preferred take the external work first.

Glazier.—External glass to skylights, windows, doors, then internal lights and screens, and pavement lights last.

Painter and Paperhanger.—Internal work to ceilings, walls, wood and ironwork, and polishing. Then external painting to wood, iron and cement work.

As to the order in the trades I have not mentioned such as bellhanger, gasfitter, and electric lighting engineer, which are not generally of any considerable variation, there is very little to suggest, but keep the order of the work, such as the main items first and fittings afterwards.

I might mention that the order adopted in bills of quantities is not precisely the same in all parts as that of a specification. The order in quantities is placed to an extent to facilitate the pricing, and the order in the specification should be to distinguish quickly the position of the work.

One word before I come to the last part of this paper. If the prices in a bill of quantities are not to be taken into account in the settlement of extras and omissions or if quantities have not been supplied, then a schedule of items should be provided for the builder to fill in and be attached to the specification and form part of the contract upon which variations may be valued.

I have now, I think, stated the various points which are necessary to be observed for efficient specification writing, and I will just mention a few matters which are worthy of attention and which are not always found to be clearly stated in a specification, but are sometimes omitted altogether, taking preliminary items first.

Always state that the plant and temporary erections are to be removed when directed, such as the scaffolding, hoarding, shoring, clerk of work's office, and any other items temporary in their character. The provision of these items is usually stated in the specification, but their removal is not always mentioned.

State if the hoarding is not to be let to an advertisement contractor.

Clearly define what you mean by prime cost and provisional amounts.

State if the employer's business is to be carried on during building operations.

Mention that the contractor is to give due facilities to other tradesmen who may be employed on the premises, and also that the contractor is to allow such other tradesmen the use of his scaffolding and plant.

State to whom any coins or curiosities found on the premises or during the excavations are to belong.

If the contractor has done any work previous to signing the contract, then embody this work in the contract, otherwise an extra may be claimed for some small items, which at the time of signing the contract were understood to be included in the contract amount.

Excavator.—Where the foundations in a length of walling are not all one level, require the excavation to be in steps and not on the rake. Stipulate that there should be no excavations for ballast or sand unless necessary for the actual excavations, as this may affect the stability of the building.

Specify that brick rubbish be put under surface concrete which receives wood-block flooring or paving. There will then be less liability of damp coming through. In clay soils require the foundations to be taken down below the action of the weather. This may necessitate the foundations being taken down some 4 ft., 5 ft., or 6 ft. below an otherwise good bottom. Specify a proportion of coke-breeze, slag, or gypsum in concrete fireproof construction. It will the better resist the action of fire.

State that all foul earth and cesspools are to be removed and the excavation filled up with clean rubbish or concrete. Encase new drain pipes in concrete. If a slight settlement occurs, they will then the better hang together. Half channels in manholes are better formed in cement than with half pipes. A cleaner flow of sewage can thereby be obtained.

Then as to the items under bricklayer. Do not forget to mention these points : To tie the walls in ; to build external walls hollow, if possible, but in damp situations certainly ; and specify the lead covering over the heads of doors, windows, or arches coming within the hollow space. This will prevent the wet being communicated to the inner thickness of the hollow walls. Describe a weather joint externally to brick walls. Build the brickwork up in even heights and fill up all the joints. Let the sand be free from dirt and the water clean. Sea water or sea sand may be used where dryness is not essential. Build chimney stacks, where they appear above the roofs, either partly down from the top, or else wholly in cement, preferably the latter. Build all parapet walls and the brickwork immediately under the eaves a certain distance down in cement, and a second damp course here and to chimney stacks will not be amiss. Half-brick walls should, of course, be built in cement. Boundary fence walling should have a damp course, and preferably be built in cement.

In retaining walls against earth do not omit the weeping drains or other device for taking off the accumulating water at the back.

Smoke flues should not be too large—9 in. by 9 in. is sufficient for most fireplaces ; and gather the brickwork quickly over the fireplace openings.

Build all stoves around solid, and fill up the boxings to chimney pieces. Fires have often occurred through neglect of this precaution. Do not put too long a description to terra-cotta work because it may be the custom.

Put a straight joint between connecting walls and a heavy tower, and do not attach a large chimney shaft to the main structure.

Mason.—Stone templates should be of considerable area and tooled and not left rough. In fact, any stone upon which work is built should be tooled as a least labour on it.

Do not forget the cement packing between the rivet heads on the top of flange girders and the cover stones.

Stone hanging steps are almost better placed in position and pinned in after the building is up, sand courses being left in the brickwork for this purpose.

In stone columns or pilasters the apophyges should be worked on the shafts. The effect is better.

Portland cement will stain delicate marbles and some limestones.

Carpenter and Joiner.—When possible, employ wood block flooring on the lowermost floors next the ground. The ordinary joists and flooring for this position are more liable to decay. In this latter case let the joists and plates be of oak.

Put cast-iron shoes or stone bases to all solid door frames.

Bed window sills on to the stone sills in white lead, and do not omit the iron tongue.

The cleats to roof trusses and horns on solid door frames are sometimes forgotten.

Snow boards to roof gutters will often prevent wet penetrating when the snow melts.

Open casement windows outwards if you want to be perfectly sure of keeping out the wet.

The ends of timbers, where bedded in walls should have a circulation of air around them.

A little sap on the edges of timber exposed to the air will not be any very great source of weakness, and it will not be likely to affect the rest of the timber.

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All gutters should be wide enough to walk along. Small angle fillets at the junction of horizontal and vertical planes of a roof flat will make better work than if the leadwork be turned up sharply. This remark will also apply to lead gutters.

In some cases it is almost preferable to put a p.c. amount for the ironmongery to each door, window, or other fitment, and select the class of ironmongery afterwards.

Slater and Tiler.—Tiles and slates without boarding under should be torched.

Smith and Founder.—Let rain-water pipes stand out about 1 in. clear of the walls.

Plasterer.—Timbers over 3 in. wide should have the arrises taken off before the lathing is nailed on; this will enable the plastering to get a better key.

The walls at the backs of skirtings or any other wood work should be plastered over to prevent vermin harbouring.

The outside of all flues between timbers, floors, and where in the roof, should be roughly rendered over. This will be a preventive against fire.

Single laths should not be lapped at the joints, as is often done.

Plumber and Gas Fitter.—Do not omit the exhaust pipe to hot water circulation, or to the heating arrangements.

Keep all hot and cold water pipes well away from each other, and from the action of frost.

All pipes, whether gas or water, should be readily accessible, and if possible on the face of the walls.

The furring up of hot water pipes is chiefly found between the boiler and the circulating cylinder or tank. This portion of the piping should be easily accessible for cleansing.

All horizontal gas pipe should be laid with a fall to prevent any condensed liquid remaining in any part of the pipes, and thereby affecting the efficiency of the gas supply.

It is a good plan to fix all internal pipes about ¾ in. clear of walls, especially hot water pipes.

Do not work the hot water supply and heating arrangements from the same boiler. Failure is almost certain.

Glazier.—All glass subject to jars should be bedded in wash-leather or india-rubber as well as in putty.

I might mention that one of the best methods for glazing skylights is merely to seal the glass on a bedding of putty and then to sprig it in and paint the joint over with the woodwork of the bars. It is perfectly water-tight and there is no putty on the weather side to get out of order. This plan is much adopted in horticultural buildings, both vertically as well as in the top light glazing. The laps of the glass to top light should be cut to a curve. The water being directed down the centre of the glass and away from the rebates in the bars.

Painter.—External painting, if done in the spring or autumn will give a more satisfactory result.

No painting, papering or other decoration should be done while there is a suspicion of dampness about the building.

All ironwork should be well painted over before it is buried or covered up.

The Chairman, in opening the discussion, said that Mr. Macey's book was sufficiently known to them to lead them to expect a paper full of information. They had not been disappointed. At the same time there were portions of the paper which ought to be criticised. He might say at once that the paper contained a good deal that they already knew; a great deal of it was commonplace, though that, perhaps, was inevitable in a paper of the kind. They were told, for instance, to understand what they wrote about in a specification—that, of course, was obvious—and that deficiencies were to be made up by the provisional amount; he very much doubted the wisdom of that. As to Mr. Macey's method of getting information for his specification, if they were going to write a specification they ought to know more about the subject than was implied by getting information from friends or trade catalogues—by looking about for hints, and peeping through a knothole of a hoarding. Mr. Macey, of course, thoroughly understood the subject; but it did seem a curious thing to recommend them to take great care that copies of their specification agreed with the originals! That was so very obvious that he could hardly believe that any man who was an architect and a business man would fail to see to that. Then, as to the intentions of an architect: Surely an architect's plans and details were his specification, and they ought to be so clearly drawn that there would be no doubt as to his intentions. Writers of specifications should remember that those specifications were written simply to explain those plans; they were not meant to be a jumble of a lot of technical terms more or less understood, but were to be written so that a surveyor or foreman could at once understand the drawings and details which were given him. Therefore, the plainest possible language should be used in the fewest possible pages. A point Mr. Macey emphasised, to a certain extent, was that specifications should be drawn very much more under headings than under trades. In his, the speaker's, experience it was most useful to write as much as possible under headings, *i.e.*, a certain class of windows or doorways could be put under a definite heading and referred to in an index. When quantities were taken out, the architect's specification was as much a guide to the surveyor as it was to the foreman. It was the architect's instruction to the surveyor. As to Mr. Macey's remarks as to whether the quantity surveyor should write the specification for the architect, the architect's specification, when the quantities were taken out, was more often than not written by the quantity surveyor. He was not at all advocating that the quantity surveyor should write the architect's specification, far from it; but he felt that the architect should so clearly have the planning of his building in his mind, that his notes—not written *in extenso*, but sufficiently full for any man who understood his work—should be quite sufficient for any surveyor to take up the quantities from, and also to amplify, if necessary, the specification that he might write. Apart from his own practice, he was referring to what men like Mr. Street had done. Their specifications were amplified by the quantity surveyor in cases where quantities were taken out. He knew it was considered to be a mistake to pretend to be defending the practice of surveyors writing specifications, but that was all humbug. If the architect was in sympathy with his work, he would make his intention clear to the surveyor. The important point was that the surveyor must thoroughly understand the architect and his work if the quantities were to be taken out by him. Quantities had become almost a specification, and the more the surveyor understood the architect and his work the less likely it would become for him to make a mistake when he amplified an outline specification given him by the architect. When the architect wrote a proper specification, no surveyor's notes were required. Preliminaries should head the items they apply to, and a general description should follow the preliminaries. The paper had contained many valuable hints and, however much one might differ from Mr. Macey as to the manner in which he had put his ideas, they could not forget that he was a master of the subject, and the Association was much indebted to him for his paper. As to a schedule of prices in cases where there were no quantities, it was important to have a schedule of prices attached to the different items. It avoided much trouble at the end and was easy of settlement.

Mr. Henry Lovegrove, in proposing a vote of thanks to Mr. Macey (and to Mr. Carvill for reading the paper), said he agreed generally with the paper, though he was with the Chairman in thinking that if possible—if time permitted—an architect should write his own specifications. To a man who had been taking out quantities for years for an architect, and who knew his work thoroughly, a series of notes did very well, but it seemed to him (the speaker) that the specification should as much express the mind of the architect as the drawings, though in these days of rush and hurry when quantities were going to be prepared it was not always the rule to make contract drawings. Some surveyors said that they sometimes had rough tracings given to them to prepare the quantities and to write the specification from. The London School Board sent with the drawings for new schools a general printed specification—a kind of model specification—and the surveyors to the Board altered the specification to fit each particular building, sometimes taking out many pages in making the alterations. That was a comparatively easy thing to do in the case of a school of the usual type—to cost 25,000*l.*, say; but it would not be an easy matter to boil it down to suit the case of an alteration of 1,500*l.* He had been very glad to hear Mr. Macey lay stress on figuring plans. For years past he had had many drawings pass before him and he had found it very awkward to deal with those that were not figured. When this was not done it took some time to go over the plans and see, for instance, what the various dimensions were to be. Some architects' plans were admirably figured: the widths of rooms and other dimensions were given, and it was easy to understand these points at once; but he was afraid that the plans of five out of six architects were very badly figured. He advised young architects to see that their plans were always figured, and especially to see that the heights of the sections were given. As to the names of rooms, it was a capital plan, in very large buildings, to number the rooms consecutively; and in the specification particular rooms could be referred to by number. It was better to do that than to refer to "drawing-room," or "dining-room," &c. There were some excellent remarks in the paper about not making working drawings pictures. Some eminent architects were content to make their drawings look nice; and they found that a few lines—not enough to obscure the detail, made a drawing look effective. He quite agreed with what the Chairman had said about getting information from a friend or a specialist, and that reminded him of a story about an eminent engineeer, who had so much ability that other engineers who needed information used to lunch with him. During luncheon they put questions and got valuable information. When he first joined the Association he was in the office of an eminent church architect who hated specification work, which he put off to the last minute. After a time he (the speaker) got into the office of another architect who was most careful. That gentleman wrote with his own hands every word of a specification, and when the drawings were sent to the quantity surveyor they were a perfect description of the building. There were not half a dozen words added by the quantity surveyor when the specification was returned. Care in the preparation of a specification was, of course, essential, and in illustration of that he knew of a case of a merchant receiving a bill of 150*l.* for extras because the word "glazed" had been omitted from the description "white glazed bricks." As to full or short specifications, it depended on the nature of the work, and, as Mr. Macey had said, upon the number of the drawings. Engineers' drawings were wonderfully detailed: every little detail was shown on their drawings, but one drawback to them was the white lines on blue paper. As to the words "provide" or "supply," "provide" was an unfortunate word. The word "provisional" should follow in brackets. As to Mr. Macey's remarks about provisional sums, details were not thought of until long after a contract was settled; hence there were many discussions between the architect, builder, and client. It was a capital clause in the paper about alterations, repairs, and decorations. In altering a building it was almost impossible to properly describe the work required if it were separated entirely into trades. He did not follow what was said about the insurance being put on the cover of the specification. That would probably be given in the preliminary clauses as an item to be priced in the quantities. As to scaffolding, &c., being removed from a site, a client was often put to a considerable expense in removing worthless things when this was not provided for. Temporary offices were sometimes left a long time on the site. As to tiling and slating without boards, he always put boarding under slates and tiles. They had all had experience of difficulty with a roof that the average builder put up without boarding. As to smoke flues, they should not be too large, and he could not understand why architects made them so. Nine by nine was much better. As to open casements, when they opened inwards there was the danger of spoiling the curtain-hangings, and when they opened outwards there was the weather to be considered. As to hot-water pipes, in large buildings the hot-water engineer should provide junctions and bends with screw-caps so that the pipes could easily be cleared of fur. He did not like the system of glazing referred to by Mr. Macey. He preferred patent glazing to ordinary glazed skylights. Ordinary wooden skylights were sure to let rain in after a time.

Mr. F. T. W. Goldsmith seconded the vote of thanks, and said that perhaps Mr. Macey did not deal sufficiently with specifications

from the architect's or builder's point of view. He agreed with the Chairman that a specification was a direction to the foreman as to the method of carrying out the work shown in the drawings. If any constructive detail was not made clear by the general plans, or could not be made clear by the details which would be sent later, but which ought to be sent with the general drawings, then the specification could be called into requisition. Any particular method which the architect would like adopted in the work should be particularly noticed in the specification, and each trade should have headings describing minutely the manner in which certain works have to be done, and the interpretation of the terms used in that trade. There were plenty of terms used by specification writers that very few builders or foremen know the meaning of exactly, and they should, by means of the specification, be put in possession of such exact information as would prevent misunderstandings. Where there was a chance of the contractor showing that better work had been done than was specified, there was a tendency to take advantage of it. The specification should be so clear that there would be no room left for dispute. As to the grouping of similar items, that was important. It was important that such items as doors and windows, and other articles of similar design, should be described in a carefully-drawn clause, and the numbers of the rooms in which they occurred given afterwards, and any slight variations noted. There was a disposition to regard a specification as a kind of stepping-stone to bills of quantities, but if they could not write a specification independently of a bill of quantities, it was not much use writing it at all, for if an architect who wrote a specification depended upon the quantity surveyor's subsequent assistance, it would be far better for him to draft carefully-considered notes and give them to the quantity surveyor, who would be better able to deal with them from his point of view in the bills of quantities. Mr. Macey thought it ridiculous to specify timber free from knots. He (the speaker) did not think so, bearing in mind the kind of timber occasionally seen in buildings. The definition gave the architect a pretty free hand. As to the drawings and the specification being taken together, the one interpreting the other, and where no quantities were provided, he thought that a clause similar to the following might be advantageously included in the specification :—"That where any item of work is not mentioned in the preceding [or following] specification, and such items can obviously be inferred, from either the drawings or the specification, to be necessary for the reasonable or proper completion of the job, the builder is to perform such work without extra charge." A hinge, for instance, is specified, and the screws might not; but they were obviously implied. In his experience he found that builders did not object to such a clause. A schedule should be part of every specification ; it was a splendid check upon a builder who was inclined to overcharge. As to arranging trades under headings, he thought it would mean a lot of overlapping.

Mr. Banister F. Fletcher said the subject was a rather amusing one, for every now and then it came up for discussion, and every one said that architects ought to write their own specifications, and then gave excuses for not doing so. There was no doubt that a quantity surveyor could, as a rule, write a specification better than an architect ; whether he should do so was another matter ; but no man was so well able to write a specification as he who had taken out the quantities for the building. A great part of the paper seemed to be taken up with a description of building construction, and as such it hardly came within the subject of specifications, except that it enforced the point that unless they knew how to construct a building they would not know how to construct a specification. A large part of the paper seemed to refer to specifications which were prepared in cases where there were no quantities. That was a system of building of which one saw little in London, because builders objected to tender without them. The system of tabulation mentioned in the paper was one which should always be practised. The man who used the specification most was the builder's foreman, and he was never allowed to see the quantities. Architects were supposed to write their own specifications, but if they had to do all that they were expected to do he was afraid they would have to strike. If one wrote the specification in trades, he did not see how they were to include, say, a description of a casement and all belonging to it. A difficulty would be in getting a proper index in that case. He did not believe in type-written specifications, and he had never seen a type-written specification that did not show a good many blunders. It was far better to have the specification lithographed or printed. Old specifications, if used with care, could be employed with advantage, he thought. He did not think that, in the case of timber, it was usually specified to be "free from knots," though it was specified to be free from large loose, or dead knots. Very few architects, he believed, or builders for the matter of that, knew where the different timber came from. He had been using Carolina pine recently, and that was practically without knots. The best way to learn how to write a specification was, he thought, to go through a course on quantities; it was a great help, not only in regard to specifications, but in refreshing one's knowledge of building construction. As to engineers' drawings, as far as he knew, engineers generally got their estimates in without quantities ; therefore their drawings must be very plainly figured and finished up. As to the word "proper," it was much too often used in specifications. He did not think that because architects did not usually write specifications that it ought to be inferred that they could not. The fact was that they did not take the trouble as they could much better rely on detail drawings to express their wishes. If an architect could find a thoroughly competent man, there was no reason why he should not be relieved of such work as specification writing. In books on the subject, specifications were treated in a very encyclopædic way, but he doubted if clients got better buildings where the specifications were very full. The best specification was the short one.

Mr. C. H. Brodie said he could show Mr. Fletcher a few dozen satisfactory type-written specifications. Type-writing depended for success upon the person who did it. As to Mr. Goldsmith's remarks about screws not being specified where hinges were mentioned, he (the speaker) had never seen a decent specification which did not mention the screws in reference to hinges. As to Mr. Macey's paper, it was all very well to pooh-pooh the statement that they should see that the specification agreed with the drawings ; but it was a very necessary remark to make in such a paper, because very often they did not agree. The specification, when it came from the type-writer or lithographer, should be compared with the original copy by the writer of it. He did not agree that a specification was a legal document, and most certainly it should not be in legal phraseology. They should by all means tabulate (viz., take doors, for instance, and show how they are to be finished), but he should most certainly keep to the trades for a description of new work. It was easier, too, to write a specification if it was kept strictly to the trades. As to the use of the word "best," the late Mr. Ewan Christian once remarked in that room that when he said "best" he meant best and was not using a trade term. He did not agree with Mr. Macey in recommending that drains should be encased in concrete.

Mr. G. M. Nicholson said that in writing a specification where the surveyor and the architect knew each other well, the surveyor knew what the architect wanted in most points ; and where special instructions were needed, a few short notes by the architect would be sufficient. There were many clauses in a specification which applied to almost all buildings, and it was unnecessary for the architect to waste his time in copying these out on every contract. Writing a specification in trades made it much shorter, as items like templates, linings, architraves, glass, &c., could be described generally to cover all items, instead of repeating them with each particular case in which they occurred. Vague clauses like "unless otherwise described," should be avoided unless great care was taken, as it sometimes happened in the same specification that one found "Render float and set all internal walls unless otherwise described," and also "Finish the internal walls with fair face and twice limewhite unless otherwise described," which left it quite uncertain as to the work to be done. As to mistakes in typewritten specifications, it was his experience that they generally arose from badly-written drafts.

Mr. Max Clarke said he entirely disagreed with definitions of "best" ; so far as specifications were concerned, they were all unnecessary. "Best," as applied to timber, iron, steel, and Yorkshire stone would make the use of those materials, as regards cost, prohibitive. The best Bangor slates were really unobtainable unless they were made specially. If Mr. S. Flint Clarkson's ideas* were put into practice difficulties in regard to "best" would not occur. As regards specifications, if the quantity surveyor knew the architect, the architect's notes were quite sufficient. They were a specification in brief ; but if the architect did not know the quantity surveyor, then he must fill pages of foolscap with queries which the architect must answer. There were two kinds of specifications—one encyclopædic, for use in the office, and the other for the foreman. The foreman's specification had no business whatever to have the date of completion of the work mentioned in it, or the mode of payment, though there was some reason for the inclusion in it of anything about keeping in repair. Points as to insurance should be also included in the specification. He disagreed with Mr. Macey when he said that the planking of the foundations should be put at the end of "excavator." That was essentially one of the items to go in the preliminary part ; it applied to every part of the excavations. As to clearing-up after building, it was important to see that clearing-up the rubbish was arranged for. A builder could remove all his material and yet leave the building and the site covered with rubbish ; he should clear up the rubbish, not only at the completion, but as it arose, so that it might not hamper the work generally. Mr. Macey had suggested that foundations should be carried down a sufficient depth in clay soil, but that was a point which was entirely outside the stipulation of a specification. They had no right to compel a builder to carry the foundations down any depth beyond that shown on the drawings unless they were prepared to pay for it. Mr. Macey omitted to mention that zinc or galvanised iron nails should be used in plaster walls or ceilings ; where other nails were used they showed through. A very large number of bad specifications were prepared, he thought, whether the architect or the quantity surveyor wrote them.

The Chairman, in putting the vote of thanks to the meeting, said he did not want to be misunderstood. He did not advocate that an architect should leave the specification entirely in the hands of the surveyor ; but he thought that a surveyor who thoroughly understood the architect's work could amplify the architect's notes, or the architect's shorthand specification. Those notes were quite sufficient when the surveyor understood the architect. Mr. Macey said, in his paper, that all gutters should be wide enough to walk upon. Fancy that in a small house! It must be a mistake. [A member: He referred to lead gutters]. If so, that is not clear in the paper. As to copies of the quantities not being given to the foreman, he always gave the clerk of works an unpriced copy of the bill of quantities. The clerk was thus enabled to keep in touch with the actual work put in and to keep an account of it. He still held that in restoration work heads were better than trades; it saved an amount of explanation and expense, saved extras, and was often a help to the foreman.

The vote of thanks was then put and heartily agreed to.

Mr. Carvill briefly replied, remarking that the paper proved that there was room for an improvement in an architect's specification. He thought it advisable to avoid old stock specifications.

The Chairman announced that the next meeting will be held on May 12, when Dr. G. V. Poore will read a paper on "Soil and Aspect in Relation to the Dwelling-House."

The meeting then terminated.

LADY HOLLES'S SCHOOL, RED CROSS-STREET.—The Fire Brigade Committee of the London County Council are about to purchase for 31,000*l.* the school site and buildings, No. 38, for the erection of a station, in lieu of that in Whitecross-street. The school was founded for sixty girls of the parish of St. Giles-without-Cripplegate, under the will of Lady Eleanor Holles, dated September 26, 1707, and endowed with one house in Spital-square and eighteen in Fort-street, near the old Artillery Ground, Bishopsgate Without.

*See the *Builder* for November 13, 1897, for Mr. Clarkson's paper, "A Proposal for Classifying Builders' Work."

ARCHITECTURAL ASSOCIATION SPRING VISITS:

VISIT TO EALING.

ON the 29th ult. Ealing was visited by a party of about two dozen members of the Architectural Association. The first object of the visit was to see a Roman Catholic Church, in course of erection from the designs of Mr. F. A. Walters. Of this only two bays are at present being erected, and they are not yet roofed in. The plans, however, were inspected, and they show what will be a fine church with an internal total length of 200 ft., a nave 25 ft. wide in the clear, and narrow side aisles, bringing the width within the walls to about 35 ft. The design shows a pair of transept towers, an arrangement to be seen at Exeter Cathedral and at Ottery St. Mary, Devon. The style of the church is in a refined and correct Gothic, as far as could be judged.

After leaving this building the party visited St. Peter's Church (Anglican), built some time ago by Sedding. This is an interesting building showing in every part the mark of an artist's individuality. The church is said to have been finished after Sedding's death by Mr. H. Wilson or, at any rate, that gentleman is partly to be credited with the work. There are but few points to which exception can be taken, the chief of which appears to be the way in which a sort of "false" parapet over the nave arcades pierces through what would otherwise be a very large and continuous slope of slated roof. The effect is not happy, and perhaps the designer may have himself been dissatisfied with it. There is a tower to be built at the north side in a transeptal position. This will doubtless improve the general effect very much. There is an unusual feature in the interior, namely, a triforium where most small churches would have had a clearstory. This it is which creates the large expanse of roof above referred to. Its effect internally is very good. The aisles beneath this triforium are flat ceiled and very fully lighted by long (laterally) square-headed traceried windows. There is a very large west window set back from the face of the west front and strengthened by traceried buttresses set at right angles to two large mullions in it. This and all the windows are glazed with plain glass with oblong panes in the lower parts and ornamental leading in the tracery. The whole is very graceful and refined. The chancel is raised about six steps above the level of the nave and is enclosed with a parapet wall of dull polished Purbeck marble and white stone in alternate bands. This parapet curves back in the centre where the steps lead up. The piers of the nave, the niches, and canopies, and all the details have a freshness and individuality that is very pleasant to perceive. The doors are externally covered with repoussé brass plating, and on the western door is inserted in this plating a bronze cast apparently from a design by Mr. Pomeroy.

The third object of the visit was a new church, almost complete but not yet consecrated, which has been erected from the designs of Mr. G. H. Fellowes Prynne, who very kindly placed the plans for inspection and conducted the party over it. It is a large and apparently inexpensive structure, the nave being 112 ft. 6 in. long by 48 ft. wide, with narrow passage aisles. The chancel is 41 ft. 9 in. long. The materials are chiefly red brick, both within and without, with stone dressings. The woodwork is pine stained green, the roof being ceiled in barrel form with narrow widths of pine and stained but not varnished. A gallery on each side of the chancel has panelled pine fronts stained green and varnished, with a not unpleasing effect. There is a rood beam of oak which is level with the springing of the chancel arch, and consequently very highly placed. On it are a cross with a figure of our Lord carved in some white wood, perhaps limewood, and on either side a figure in the same material. The floor of the nave is paved with pitch-pine slabs laid in various patterns. That of the chancel has Rust's vitreous mosaic in plain expanses with marble step treads. The church is lit by electricity, and the pendants are of wrought-iron partly gilded. The heating is by hot-water pipes laid in channels in the floor and covered by gratings, and there are supplementary radiators in the transepts to north and south. The latter occupy the space of the two easternmost bays of the nave. There is also a baptistry at the west end of semi-circular form, and a morning chapel on the east side of the south transept, or what would be the east sice if the church were truly orientated, which it does not appear to be.

THE INTERNATIONAL BUILDING TRADES EXHIBITION.

SECOND ARTICLE.

THE "Smoke-abatement" section is one of considerable interest. Although not consisting of many exhibits, it nevertheless has some good devices, which appear to more or less solve the difficulty of smoke abatement. There seem to be three principal methods by which inventors have endeavoured to produce smokeless fires—first, the use of anthracite coal; second, the replenishing of the fire at the entrance, so to speak, of the fresh air to the point of combustion; third, the supply of an increased air supply.

Mr. E. E. Pither shows what is called the "Ever Radiant" stove, burning anthracite, and a kitchener burning small soft coal otherwise known as smudge coal, or slack, the principle of combustion being in both cases of a similar character. Coal is added on the top of the fire, but the visible portion of the fire is divided from the combustion chamber by a baffle of iron and fire-brick which diverts the flame and products of combustion downward so that the gases given off by the fresh fuel passes through the hot fire, and perfect combustion with practically no smoke, after the fire is once started, is the result. It is claimed that an economy in fuel as well as the abatement of smoke is ensured by this method, and as there can be no doubt that the fuel is more perfectly consumed the claim seems to be a just one.

Messrs. Richmond & Co., Limited, have what they call the "Quaker Grate," of which the salient features are a wire gauze blower and rocking bars which facilitate the entry of air into the fire, and so cause more perfect combustion. The wire gauze blower does not obscure the light of the fire, and although the visible portions of the fire are rather dull, there appears to be an improved combustion.

The same firm have some good examples of gas cooking-stoves, in which cleaning is made easy by removable burners and other fittings.

The Automatic Furnace Syndicate, Limited, show a machine for feeding large furnaces for boilers, kilns, &c., in which the fuel is supplied to the furnace below the burning fire by the operation of a screw worked by a motor. This, therefore, is a device which produces more perfect combustion by adding the fresh fuel below the fire.

The Domestic Crater Company, Limited, show a small device in the form of an arched grating intended to conduct the air to the centre of the fire, and heat it in its passage. By this means either anthracite or soft coal can be burnt, and some amount of good is done by what is virtually an extension of the grate surface.

Messrs. Henry Rossell & Co., Limited, have an automatic smoke preventer for use with boiler furnaces, which consist of a series of louvred shutters opened and shut by the action of a cataract cylinder. The shutters are turned automatically when the furnace door is opened for firing, and as the fresh fuel gradually becomes incandescent, so the louvred shutters gradually close by the action of the cataract cylinder. This, therefore, is an invention aiming at increased air supply to the fire at a time when it is most needed.

The Incandescent Fire Mantle and Stove Company, Limited, show an invention which has been before the public for some time, consisting of light wire net-work, in which are fitted a number of earthenware funnels; these accordingly project into the interior of the fire, and it is asserted supply air to the interior of the combustion area. This contrivance seems to work best either with coke or anthracite.

The Automatic Fuel Economiser Company show another small device intended for domestic use. The automatic economisers are hollow box-like pieces of cast-iron intended to heat the air, and also admit a greater quantity to the interior of the fire. They are usually placed at the back and side of the fire, and thus endeavour to effect the same object as the incandescent fire mantle, but from the opposite direction.

The London Warming and Ventilating Company, Limited, have about the largest show in this section. A grate, with special draught for burning anthracite coal, and a "salamdre" closed stove with mica front, and an arrangement at the base for automatically regulating the draught. This burns either anthracite or coke. In fact, the exhibits of this company are chiefly directed to the burning of anthracite, and it is claimed that the increased cost of the coal is more than made up by the smaller amount used. The same firm also show what is called "Ye Old Yule Log" gas fire, which, by the aid of asbestos shavings, similates the burning of the yule log, although the fuel employed is gas. The best feature about this, from an æsthetic point of view, is that the dogs in connexion are many of them very well designed. The same firm, acting as agents for the Masbro' Foundry Company, Limited, also show one of their ranges with the barbarous name of "Stokezi," but with a clever and useful contrivance for feeding the fire from the bottom.

The Dowsing Radiant Heat Company, Limited, have an exhibit in the Smoke-abatement section, showing the possibility of using electricity for warming purposes. The electric radiator consists of a number of ground-glass incandescent lamps, with polished copper screen behind from which the heat is radiated. The possibility of warming by electricity without smoke is undoubted, but the cost is quite another matter.

Messrs. S. Clark & Co. show their well-known hygienic siphon gas-stoves.

The Belcher Smoke Preventer Company show several of their instruments for use with boiler furnaces, which may be shortly described as intended to inject air into the furnace by a steam injector, supplying, therefore, air and water vapour to the fuel in combustion.

The Electrical section is not very large, and does not contain anything strikingly novel with the exception perhaps of the exhibits of the Simplex Steel Conduit Company, who propose to substitute steel tubes for the ordinary wood casing of electric wiring, whether for exposed or buried conduits. The possibility of this has been thoroughly worked out, and all kinds of junctions have been devised for meeting various requirements, one great merit of which is that inspection is provided for at bends and junctions. It is also a point in favour of the system that the labour in fitting up is so much reduced that steel conduits can compete successfully in price with ordinary wood casing.

Extensive exhibits of fittings are shown by Messrs. Julius Sax & Co., Limited, Messrs. Drake & Gorham, the Edison and Swan United Electric Light Company, and J. M. Doughty; andlas special features we may mention the arrangement of an electric water gauge for tank alarms by Messrs. Sax & Co., and the "Jandus" arc lamp, which is enclosed in opal glass globes, shown by Drake & Gorham, whilst the Edison and Swan Company have as special features apparatus for cooking and heating by electricity and a bicycle with a lamp worked by a small dynamo on the back-wheel. The Dowson Radiant Heat Company, Limited, repeat here their exhibit of an electric radiator to which we have referred in speaking of the Smoke-abatement Section.

Messrs. Johnson & Phillips have examples of various forms of electric cables and insulated wires.

Mr. Arthur Koppel has a model of a portable electric railway, showing how a light railway for use in factories can be worked by the overhead trolley system.

The exhibit of F. W. Potter & Co. has but slight connexion with electricity, as the ventilating fans shown are worked by an electric current, though similar electric fans are shown in the main section of the exhibition by other firms. At the same stall are also shown "steel lead" stair treads, which consist of steel wire netting embedded in lead, and resemble closely a similar form of tread in the main section, shown by the Lytes Metallic Woven Stair Tread Company, which appears to answer the same purpose, but uses rather less lead.

In sanitary fittings there are many good and well-known exhibits, and also some few novelties. Mr. A. T. Cooper shows a useful and simple idea in the form of Brazier's taps for stopcocks, in which the stopcock is arranged with a bib or other tap on each side, so that either or both sections of the pipe can be drawn from or emptied when the stopcock is closed. Mr. Ernest Smith shows an iron joint for stoneware pipes and connexions for main sewers and house drains, the essential feature of which is the provision of iron sockets and spigots cemented to the stoneware pipe, and a

joint formed by a loose strip of lead, subsequently caulked by hand after the joint is made.

Mr. T. B. Davis has an improved siphonic closet with a good after-flush. He also shows various forms of other sanitary fittings, quick-waste valves, and gun metal work for baths.

The Valveless Syphon Company have several forms of siphon cisterns, the merit of which consists in the practically noiseless action attained.

There are several exhibits of opalite and other imitative forms of opaque glass wall tiling.

The Mansfield Patents Company have several ingenious devices connected with sanitary work, the most striking of which is their connexion for lead and earthenware pipes, consisting of a fireclay block, covered on the inside and ends with lead, so that the earthenware pipe may be cemented to earthenware, and the lead soldered to lead. The same firm have also a good gulley and air-tight cover, and valveless siphon cistern.

The Nottingham Patents Company have a useful form of inspection and test-pipe for drains. It may be described as consisting of a double junction on a single length pipe. so that drains may be cleaned or inspected from the surface of the ground, without the expense of an ordinary manhole chamber.

Lowe's Patent Sanitary Pipe Joint Syndicate exhibit their system of making joints which was described in our issue of December 25, 1897, and has satisfactorily stood the test of two years' use.

The well-known firm of Shanks & Co. show their baths, but no novelty with the exception of a new quick-waste valve.

Mr. D. Hurst has an automatic water-closet, which does away with the necessity of ball-tap siphon cistern and pull, a flushing cylinder being arranged which is fitted with valves and compressed air-chamber actuated by the weight on the seat, and appears to be a useful invention.

Anderson's Patent Pipe Coupling Syndicate have a coupling for lead pipes, or lead and iron, which does away with the necessity of wiped joints at a decreased cost and increased efficiency and safety, and which possesses besides the great advantage of easy disconnexion and inspection or repair, if needed, to the lead pipe.

The modern idea of fixing rain-water pipes at a distance from the wall is rendered easy by Baker's patent drip lug, in which the lug is cast on and forms part of the socket or length of rain-water or soil-pipe.

A bewildering variety of reversible and safety window-sashes are shown by several exhibitors. The N.A.P., of course, exhibit their well-known and well-tried specialities.

Messrs. W. G. and L. England show a form of slide and reversible sash windows.

Mr. J. C. Moore has some sashes fitted with ingenious devices covered by several patents, which provide a satisfactory form of easily-cleaned double hung sash.

The Easy Cleaning Window Company also have some ingenious devices for effecting this object, and so also has the well-known Mr. Robert Adams, who besides shows some good automatic check-action spring hinges and sash balances, in which a coiled steel spring is used in place of the ordinary lines and weights for double-hung sashes, thus offering a solution of the great difficulty of using double-hung sashes with mullioned windows.

Interesting samples of Kauri pine and Jarrah are shown by Messrs. Foy, Morgan, & Co., and a collection of various kinds of timber, hard wood and soft, by Messrs. W. & C. Johnson.

Wood-block flooring is represented by Messrs. Charteris & Longley, who also exhibit an interesting model illustrating the patent process which they adopt for seasoning timber by a special treatment of steam and cold air, that is efficient without unduly dessicating the wood.

Fire-resisting materials are represented by Messrs. Frederick Jones & Co. with their silicate cotton and fibrous plaster; The United Asbestos Company with their well-known Salamandie decorations; The Fireproof Partition Syndicate with the Cunnah-Wright patent, dovetailed, corrugated iron sheets, and the Cunnah-Wright patent laths, both of which are useful and economical bases for plastering. Messrs. Broadbent also show how silicate cotton or slag wool may be used, and so also do Messrs. Anderson & Son and Messrs. McNeill & Co., the well-known manufacturers of roofing felt.

Messrs. Dowson, Taylor & Co., show some self-closing armoured fire-resisting doors which are constructed on the principle largely used in America, the door being of solid wood covered with tin or tinned iron. The self-closing is brought about by the fusion of a soft metal attachment or "cut-out" in the line supporting the balance weights. On the "cut-out" fusing the balance weights drop and the door closes by its own weight. There is very little doubt that a wooden door covered with sheet tin is superior to the ordinary iron so-called fireproof door which invariably buckles in a conflagration.

There are some examples of ventilating apparatus, though not very much that is new.

Messrs. Ewart & Son have some hydraulic ventilators, as well as a fixed gill automatic ventilator, and their revolving or archimedean screw type. Messrs. Thomas Ash & Co. show Cooper's patent "Acme" ventilators, which are a form of self-acting extract ventilator, that is simple and cheap in construction, and should be efficient in action. Mr. B. Hainsworth has also some upright fixed gill self-acting ventilators, and others which are a combination of these with a protected double cone.

The well-known Blackman ventilating fan is shown, and so also is the "Cyclone Air Propeller" of Matthews & Yates of similar type.

Good examples of stoves and ranges are exhibited by Messrs. Ashton & Green; Yates, Haywood, & Co., and Moorwood, Sons, & Co., the latter especially, having interesting examples of cooking ranges and hot plates for large institutions.

Mr. Thomas Potterton shows once again his patent range boilers, with some slight improvements for utilising the kitchen range as a source of supply for hot water heating in the house.

The well-known Welsbach Incandescent Gaslight Company have an exhibition of their gas-lighting system, and so also have the Incandescent Accessories and Maintenance Syndicate, who lay themselves out for anti-vibration and other devices for preserving mantels, and also an improved form of argand burner intended to give a steady and bright light that may without a mantel compete with the true incandescent.

There are several examples of damp courses ranging through various degrees of excellence, from the true asphalt of the Limmer Asphalt Company to some almost worthless examples of felt. Callender's Bitumen Damp Course and Sheeting and the Patent Vulcanite Roofing Company's material may be mentioned as examples of useful and satisfactory damp courses, formed of a combination of fibrous and bituminous material.

The British Luxfer Prism Syndicate show some of their window glass and pavement lights, including some interesting examples which have been subjected to the action of fire—indicating that their glazed partition offers a considerable amount of resistance to the spread of a conflagration.

There are several exhibits of wood-working machinery and gas engines by well-known firms.

The exhibition of sanitary ware, and glazed clay goods generally, is a good one, many of the leading firms being well represented. Mr. George Jennings has a large stand on which a number of specialities for which his firm is noted are displayed. In addition to damp-proof courses, grease traps, drain pipes, baths, sinks, &c., there are a few novel or interesting exhibits. There is the "patent joinder" for stopping up the ends of drain pipes, the special advantage of which is that the "joinder" can be readily knocked off without interfering with the terminal pipe, so that when an extension is desired the additional pipes can be readily fixed. The "London Grate" is also worthy of note. The main features of this as distinguished from ordinary warming and ventilating grates are that all metallic heating surfaces are avoided, and instead of the air being highly heated by contact with hot metallic conducting surfaces, it is moderately warmed by prolonged contact with fairly well-heated and imperfectly conducting surfaces of fire-clay. As the air is admitted it enters the lowest portion of the warming chamber; from this, flowing alternately through the openings, it is gradually warmed by contact with the fire-clay back and flanges of the warm-air chamber until it is finally discharged either at the top of the stove, or, if preferred, through a warm-air shaft conducting to an outlet near the ceiling. The mantelpiece and supports are of iron. The same firm also shows the "Cambridge grate," especially useful in dormitories and hospital wards. With this, so long as the flue is warm, the air withdrawn from a room when the fire is out is replaced by fresh air equally warmed by its passage through the ventilating body of the grate, which is much hotter than the flue, and remains warm for some hours after the fire is out.

Messrs. Doulton & Co. have a large exhibit of their clay goods used in building, including sinks, lavatories, bath fittings, blue bricks, pipes, and the like. A special feature is the show of decorative architectural materials, such as enamelled stoneware, salt glazed decorated stoneware, glazed faïence and enamelled faïence.

Messrs. Stiff & Sons have a particularly fine Corinthian cap in buff terra-cotta, showing what delicate and minute undercuts may be executed in a good terra-cotta clay by expert manipulators. There is also a carefully executed arch panel, in which the members come out very clearly. Some figures, too, in the same buff terra-cotta, serve to illustrate the uniformity of the clay employed and the excellence of the firing. Messrs. Stiff have the usual assortment of drain and channel pipes, sinks, &c., in stoneware, for which the firm is noted.

Messrs. George Skey & Co., of Tamworth, have a large exhibit of sanitary specialities and appliances, chiefly in glazed stoneware, also terra-cotta chimney tops, fire-bricks, blue bricks, stoneware pottery, &c. Amongst the novelties here is Cullis & Beaven's patent "combined sink standard and waste," in stoneware. This sink may be supported by one, or two hollow standards, which provide the means of conveying the waste-pipe. In the double form one of the standards, depending upon circumstances, contains the sink-pipe, which may be of stoneware or metal. The sink is so constructed that the trap or pipe can traverse the entire length of the standard, and thus be adjusted to the outlet of any sink, whether it be in the corner, or middle, or end of the sink. The side of that standard which contains the waste-pipe remains open for purposes of inspection. "Skey's Improved Channel and Gully Trap," as exhibited, enables the sink waste to discharge 18 in. away from the gully, instead of over it. In addition to preventing (to a large extent) sewer gas from entering the house through the sink-pipe, through leakage of the trap, or otherwise, this method provides accommodation for collecting water from the bath, as well as rain-water. The channel is a special feature in this arrangement; it is recessed or under-cut throughout its entire length, on both sides, to prevent the bath or rain-water from splashing or running over the edge. This channel allows grease from the sink to chill before reaching the gully in order to minimise the possibility of choking the drain-pipes. This method is certainly ingenious, but the channel might, with advantage, be longer than 18 in.; there would, in most cases, be accommodation for that, and there would be less possibility of sewer gas entering the house through the medium of the bath-pipe, which is nearer the gully trap than is the sink outlet—at least in the examples shown to us. Of course, this observation applies only in the case of the gully trap getting out of order. Messrs. Skey also exhibit "Trew's Grease Trap," which collects the grease in a perforated receiver placed above the outlet bend in such a position as that the top of the receiver is just above the water level.

Messrs. Jos. Cliff & Sons, Baltic Wharf, Waterloo Bridge, have a large exhibit of architectural terra-cotta, glazed bricks, faïence mouldings and panels, Hall's patent hanging tiles, locking tiles, porcelain baths, lavatories, drain-pipes, &c. Messrs. Candy & Co., of Newton Abbot, have a large stall on which is displayed numerous examples of salt-glazed bricks, buff vitreous terra-cotta stoneware pipes, and many other of the firm's well-known manufactures.

Messrs. John Knowles & Co., St. Pancras, show "Vitrifine" stoneware pipes, three 6-in. specimens of which, selected haphazard from the firm's ordinary stock, have been tested, and indicate that these pipes can withstand a pressure of from 250 lbs. to 625 lbs. per square inch before bursting. The "anti-vap" street gully, also exhibited, affords a deep well for all

sediment, so that it does not require cleaning out very often. The outlet is high, and it has a large trap with a comparatively small surface of water exposed, so that in times of long drought the drain shall not be unsealed by evaporation. The trap is easily accessible for cleaning purposes by the use of an ordinary tool from the ground level. The "Wyvurst" patent channel junctions, terminals, and inlets for inspection chambers also form part of Messrs. Knowles & Co.'s exhibit. A stoneware junction pipe is shown, indicating the durability of the material; it has been exposed thirty-seven years at the firm's St. Pancras depôt. Amongst many other exhibits at this stand, we notice "Callender's bitumen damp course," an excellent material, employed in many large buildings.

Messrs. C. W. Outram & Co., of Woodville, near Burton-on-Trent, have an assortment of their sanitary earthenware, including lavatory basins, urinals, stands, &c. A special exhibit is the "Aquarius" closet, in which, amongst other things, the outlet may be turned in any direction. Around the outlet a recess or groove is formed in the earthenware, into which the end of the special fitting supplied is inserted. Liquid cement is poured into the groove, thus making a tight joint.

Mr. James Woodward, of Swadlincote, has an interesting stand on which are shown several specialities, and examples of stoneware pipes and connexions. "Freeman's Patent Inspection Chamber" is exhibited in section, so that its special features may be readily seen. In addition to being an ordinary inspection chamber, this presents a glazed surface to the sewage, certainly an improvement over methods which expose cement faces to the sewage, as the cement is liable, in most instances, to be impregnated with the fæcal matter. In Freeman's patent all exposed surfaces are glazed. The "Improved deep-socket Archer joint" is shown by the same firm. The chief feature in this is the employment of clay or plastic placed round the shoulder and recess of the spigot end of the pipe inserted to be joined. This clay, being firmly fixed when the two pipes are joined together, prevents leakage from within, by reason of its impermeability. In the same way, the clay round the shoulder prevents water, &c., from getting into the pipes or setting up decomposition in the cement. After several pipes have been tapped home with this clay dressing, the joints are run with liquid Portland cement. The interior frill of clay is removed with a half-circle rake immediately after each pipe is driven home. Cups of clay are placed round the cement holes before the joints are run. By these improvements, the whole joint is practically impervious. Another interesting exhibit here is "Ewing's X-entric shoulder pipe," by means of which a strong gas and water-tight joint is easily made. A roll of clay or plastic is placed round the bottom of the socket before the pipe is driven home. The socket is then packed with Portland cement in the usual way. Mr. Woodward also has a good assortment of other clay goods, amongst which we noticed some glazed bricks having the glaze remarkably uniform, and of good, even colours.

On the stand of the Nottingham Patents Company, of Nottingham, we noticed an inspection and test-pipe for drains. This can be fixed at the end of a set of drains, or in any other position, with the mouth of the double combined junction upwards; pipes are then fixed into the mouth of the junction and carried upwards to the level of the ground and sealed over. By this method a drain-cleaning machine may be inserted into the pipe at the ground level, thus saving time, and expense of breaking open the ground. In the same firm's "Patent air inlet valve for drains," the valve is made of aluminium to prevent corrosion, and giving more freedom in working.

In addition to the assortment of bricks shown by the Somerset Trading Company there are the "Patent Rainbar Plaintiles." These are manufactured from selected Bridgwater tile-clay, and have a transverse bar on the upper surface of the tile and a transverse groove in the under-side. These are designed to prevent draught under the tiles, as well as snow and rain-drift.

Messrs. Jos. Wedgwood & Sons show the application of glazed wall-tiles to internal and external decoration in a small house erected for the purpose. There is also a collection of vases, besides specimens of tiles for walls, floors, &c.

Messrs. Broad & Co., of South Wharf, Paddington, exhibit "engineering bricks," white, glazed, blue, red, and stock bricks, as well as gully and grease traps, sinks, &c. Messrs. Gibbs & Canning, of Glascote, Tamworth, have a good selection of architectural terra-cotta and a large variety of sanitary and other ware. Messrs. J. Mitchell & Co., Drury-lane, have a central stand on which is an assortment of sanitary stoneware goods. In the "Siphon" closet, a speciality, there is no air nor water jet, nor double trap. It is about to be placed on the market. In a large white enamelled fire-clay urinal stall the flushing holes are made in the ware and not in a metal pipe, the object being to prevent corrosion and discoloration. The Ames Crosta Sanitary Engineering Company, of Nottingham, exhibit stoneware pipes, water gullies, and the like. The Farnley Iron Company, Leeds, have a good selection of fire-clay sanitary sinks, baths, and other sanitary goods, and glazed bricks. Amongst other exhibitors of sanitary stoneware are Messrs. Hall & Boardman, of Swadlincote; Messrs. Oates & Green, of Halifax (who have a large number of their well-known specialities); Mr. John Burn, of Hartlepool; Messrs. G. & F. Couzens, of Cardiff; and Messrs. Geo. Howson & Sons, of Hanley. Messrs. Stanley Bros., of Nuneaton, have erected a little house, faced with salt-glazed bricks, and also have a good selection of terra-cotta, pipes and connexions, tiles and vases.

The manufacture of clay goods is illustrated in the exhibition by brickmaking machines, some of which are at work; by designs and models of kilns; also by tools and the ordinary outfit of the brickyard. We noticed a model of Ashby & Batley's patent brick dryer exhibited by Messrs. Hooper & Co., of Southampton.

The Newellite Glass Tile Company, Cannon-street, exhibit specimens of the tiles both fixed and loose. The special feature in these is the bitumen backing, which, by reason of its elasticity, tends to prevent the glass facing from cracking through changes in temperature.

Amongst exhibitors of plaster decorations are Mr. H. E. Gaze, of Hinde-street, Manchester-square, in whose material jute fibre and plaster of a special kind is employed; the reliefs were remarkably sharp. The Ventura Syndicate, Walbrook, show fibrous plaster slabs, Hitchins' patent, by which lathing is dispensed with. The Granite Silicon Plaster Company, King's-road, St. Pancras, have erected a small house, displaying the possibilities of the material, which dries quickly and sets very hard. Messrs. S. Wright & Co., Amhurst-road, Hackney, have an assortment of their fireproof and fibrous plaster slabs and decorative work in fibrous plaster. Messrs. F. McNeill & Co., of Bunhill-row, exhibit asphalted roofing felt, damp proof course, pipe coverings, and the like.

THE EXHIBITION OF ROAD-MAKING MATERIALS AND APPLIANCES.

In one portion of the gallery at the Agricultural Hall is to be found the collection of samples of road materials and a few appliances for road maintenance to which we have before referred as likely to be an interesting feature of the exhibition. It is, perhaps, the first specifically organised attempt to collect such things and arrange them so that persons interested in that branch of engineering and surveying work can take effective stock, without loss of time, of the valuable materials which are produced from stone quarries for road and street construction.

In conjunction with the exhibition of materials a series of lectures have also been arranged as follows:—On Friday, April 28, Mr. H. P. Boulnois, M.Inst.C.E. (one of the Inspectors of the Local Government Board), lectured on the "History of Road-making," and Mr. J. V. Elsden, F.G.S., lectured on "Road Metal;" these gentlemen dealing with Sections A, B, C, and D of the Exhibition. The remaining Sections are as follows:—

E. Road Drainage.
F. Traction on Roads.
G. Machinery Used in Connexion with Roads.
H. Covers for Access to Sewers, Pipes, or Conduits and Cocks.
I. Materials for Town Carriageways.
J. Tools Used in Road-making.
K. Kerbs and Gutters.
L. Footways.
M. Roadmen's Clothes.
N. Trees Planted on Roads.
O. Tramway Tracks and Appliances.
P. Name Plates.
Q. Direction Posts and Milestones.
R. Kiosques, Shelters, and Seats.
S. Lamp Columns.
T. Dust and Orderly Bins in or under Streets.
U. Water Standposts and Fire-alarm Posts.
V. Literature of Road and Street Construction, Cleansing, and Maintenance.

The gentlemen who have been selected to lecture on these subjects are—

Mr. S. Stallard, Surveyor to the Maidstone District Council,

Mr. J. Patten Barber, Chief Surveyor to the St. Mary's Vestry in Islington,

Mr. H. T. Wakelam, County Surveyor of Middlesex,

Mr. F. Smythe, Surveyor to the Finchley Urban District Council, and

Mr. J. W. Bradley, Borough Engineer of Wolverhampton.

The programme is therefore a very complete one, and the gentlemen who have to deal with it highly qualified.

Mr. Elsden's paper, delivered to a considerable attendance of surveyors and others interested in the subject, dealt very much and very clearly with the petrological branch of the matter, explaining the precise composition of some of the more important igneous stones exhibited, and dealing with mineralogy in a manner suitable to his audience. We do not imply that there was anything particularly novel in the substance, but neither the occasion nor the time admitted of introducing matter which would have entailed much controversy. He alluded to some extent to the experiments which were carried out about a year ago by the Hornsey Local Board to test the durability of certain stones in a machine designed by Mr. De Courcy Meade, the City Surveyor of Manchester, who was formerly Engineer to the Hornsey Board. We notice that the machine is not very dissimilar to that originally designed and constructed in France and utilised by the Department des Ponts et Chaussées, and consists of hollow cylinders fitted inside with angle irons and rotated at the speed of one revolution in three seconds for about seven hours. The tests are of two kinds, one in which the metal is rotated in a dry state, and the other in which water and stone rotate together. In each case 4 lb. weight of broken stone was used, and the percentage of loss by attrition ascertained and recorded, the lowest percentage presumably giving the most durable stone. In the discussion which followed the reading of this paper, there seemed to be a strong tendency to set aside as worthless these mechanical tests, and to rely on nothing but what is called practical experience.

But how strangely misled we frequently find ourselves in practice, and how difficult it is to assign the correct cause to the actual result. That being so, it seems to us an error to dispense with mechanical aids, notwithstanding the absence of some of the conditions of destruction or attrition which are inseparable from the life of a road-stone. But the published tables of the Hornsey Board are by no means conclusive of the relative value of the stones tested, more especially as in some cases the loss by attrition was greater, whilst sometimes it was less, when water was used than in those cases where the stone was rotated in a dry state, an anomalous result which would seem difficult of explanation. It is, of course, not easy to secure precisely uniform conditions for such tests, but, as one swallow doth not make a summer, so does it seem unwise to accept conclusions derived from tests on such small quantities of stone for such short periods. We think that the Hornsey and other Local Authorities would do well to prosecute further tests of this nature.

There was another machine, a new one, introduced to notice by Mr. Boulnois in the course of his lecture, called "The Viagraph," the invention of Mr. John Brown, of Belfast, and obtainable from E. S. Smith, of Liverpool. This is a tell-tale to measure the badness of a road, and we draw attention to it because it is an ingenious implement, and may be for some purposes of practical utility. It automatically records on paper attached to a drum the actual longitudinal section or profile of the surface of a road or pathway for any required distance by means of two pencils, one of which is fixed and records on the paper a horizontal line, whilst the other, connected with a toothed wheel, records the variations of the surface above or below that line. This wheel is fastened

between a pair of parallel straight edges, and by a constant pressure on the road surface takes the actual line of the cups or hollows, whilst the machine is drawn along the roadway like a sledge. The sum of the depths of all these unevennesses for any given distance constitutes the record of badness for purposes of comparison with that of other roads. It was apparently made in the first instance to ascertain how bad some of the Irish roads were in comparison with those on this side of the Irish Channel, and, if so, how much worse they were. With this object a very good road near Leatherhead was selected, and was indicated to show unevenness aggregating to about 12 ft. per mile, whilst some Irish main roads, such as that between Belfast and Lisburn, gave an aggregate of from 114 ft. to 120 ft. per mile. On the paper the full depth of a depression is recorded, whilst the horizontal scale is ⅛ in. to a foot. These strips of paper, if properly attested, might be produced, if necessary, as evidence in cases of litigation, but the meeting seemed to think that on this side of the Channel the vigorous protests of cyclists were sufficient rousers of public opinion, and that surveyors are not likely for some time to come to be provided with such a luxury as a viagraph.

Amongst the exhibitors of road metal we noticed examples of the various sizes of macadam and assorted screenings from such important quarry owners as, for igneous rocks, Brundrit & Company, and Darbishires, of Penmaenmawr; the three Clee Hill Companies from Shropshire, viz., Field & Mackay, the Clee Hill Dhu Stone Company, and the Clee Hill Granite Company, all of whom now charge uniform prices; Ellis & Everard, of Wakefield and Bardon Hill, in the Charnwood Forest district, near Leicester; the Enderby and Stoney Stanton Granite Company, of Narborough, also in Leicestershire; the Mountsorrel Granite Company (a very complete exhibit of their excellent and well-known metal); Ireland & Knight, of Atherstone; the London Basalt Company; Mowlem & Co., with Guernsey granite; W. H. Murray & Co., with "Ronez" granite from Jersey; the Pwllheli Granite Company, of Runcorn, with Welsh granite; Richards & Blewitt, of Rowley Regis; J. Runnalls, of Penzance, with their Penlee Elvan, which Mr. Elsden says is not an Elvan, but a Basalt, like Rowley or Clee Hill; the Shap Granite Company, from Westmoreland; Summerson & Co., from Durham; Tapp & Jones, of Corbett granite, from near Towyn, N. Wales; and Wainwright & Co., of Shepton Mallet.

In metamorphic stone the Cherbourg Quartzite Company exhibit the metal which is now so extensively used in Kent and Sussex; and in mountain limestones the Buxton Lime Firms Company; the Chirk Castle Company, of Llangollen; the Stoney Combe Company, of Newton Abbott, and W. Woodhouse, of Barrow-in-Furness, have contributed samples. In Kentish rag, Messrs. Chittenden & Simmons have a good exhibit.

Several surveyors have also sent samples of the stones which, presumably, suit them best, and they make a satisfactory adjunct to the show. There is also a special Irish section. Most of these quarry owners, and some others, notably, Blichfeldt & Co. with Norwegian granite, also exhibit setts, in which commodity there appears to be at present a boom, owing chiefly to the demand for new tramways. We recollect, not so very long ago, when the case was just reversed, when mountains of dressed setts were lying stacked and uncalled for in many parts of the country, and general depression prevailed. Happily for quarry owners, the foreigner cannot do much in this matter to relieve the difficulty, and whatever concrete may do for ordinary pavements, it does not seem to help for tramway setts.

Of the manufactured, or artificial, stones for pavements, &c., we have, amongst others, exhibits from the Adamant Stone and Paving Company of finely-crushed Aberdeen granite, the Sanitary Block and Tile Pavement Company, London, who illustrate eleven prominent features and characteristics for their block paving, and twelve for their tiles; the Patent Victoria Stone Company, and the Patent Indurated Stone Company.

To Mr. Yabbicom, the City Engineer of Bristol, the organisers of this exhibition should be especially grateful for setting up examples of street pavements and footways in various materials, and of channelling and apparatus generally in use now in Bristol, a city which is stated to have undergone much advantageous reform in recent years under his hands.

In asphalte pavings we noticed the extensive exhibits of the French Asphalte Company, of London, with their compressed rock asphalte and also with their mastic asphalte; and of the Trinidad Lake Asphalte Company.

There are also a variety of wood-paving exhibits, notably those of jarrah wood, by Palfreman, Foster, & Co., of London; and of greenwood, by Alcott, of Pall Mall. We trust that attention to this branch of the subject will tend to decrease the stenches of Piccadilly and Knightsbridge. There is an interesting set of slabs constructed of clinker obtained from destructor furnaces made up with cement (in the proportion of 2 clinker to 1 cement), exhibited by Mr. Lovegrove, the Engineer to the Hornsey Urban District Council, together with a statement of the tensile strains of briquettes of the same composition; they are on the whole sufficiently satisfactory from several points of view, notably in cost.

An attempt is being made, and has been fairly commenced, to make a universal collection of prepared samples of road stones, and in a series of pigeon-holes connected with the "Quarry" section these samples can be seen and examined. It is proposed to make this the nucleus of what may ultimately become an extremely valuable collection for purposes of comparison, and the elementary education of students.

In the Road Drainage section a good collection of street and road gullies in stoneware and iron are furnished by the Albion Clay Company, of Burton-on-Trent; the Ames Crosta Sanitary Engineering Company, of Nottingham; Ham & Baker, of Westminster; W. H. Murray & Co.; and others. And there are several useful exhibits by Surveyors to Corporations and District Councils.

There is on show a model of a very useful-looking road-roller, the invention of Mr. Cuthbert, a road surveyor at Dalbeattie, N.B., patented and called the "Cyclists' Road-Roller"; and Messrs. Aveling & Porter, of Rochester, show one of their well-known steam-rollers, which do duty also as traction engines and for driving stone-breaking machines; they have also on show a Morrison's scarifier. C. Burrell & Sons, of Thetford, have contributed a combined road-roller and scarifier, which seems to possess considerable merits. In Tramway Appliances there is a very interesting selection from the constructions of Blackwell & Co., of Westminster, for electric tramways. And there is a good collection of literature bearing on the subject generally, especially by E. & F. Spon & Co., of London. When we had concluded our survey, we were happy to find in the Miscellaneous Section a "Sir Walter Raleigh" chair in which to rest, and what it had to do with a road material exhibition did not at all concern us.

We may, on the whole, very heartily congratulate those gentlemen who have organised and supported this portion of the exhibition on the excellence of the exhibits, and the beneficial nature of its character; and we trust that the enterprise of those who have so contributed will meet with the reward that it deserves.

It is quite impossible to mention every exhibit in detail, and we will conclude our notice by mentioning the names of the following exhibitors:—Edwin Palmer (patent wire supported travelling cradle), Sissons Bros. & Co., Limited (Hall's patent sanitary washable distemper), Jas. Austin & Sons (Imperial sash-lines, &c.), Rowland Hodges (door checks and springs, fanlight openers, &c.), Anaglypta Company (relief decorations), Sydney Butler (wood-working machinery, &c.), Kirchner & Co. (wood-working machinery, gas engines, &c.), Cluse, Limited (art brass work, lock furniture, &c.), the Warrington Bond Iron Syndicate. The London Stereoscopic and Photographic Company have been appointed sole photographers to the exhibition.

In the "Coal Smoke Abatement" Section of the Exhibition, the jury appointed by the "Coal Smoke Abatement" Society have made the following awards:—*Bronze Medals*—Mr. E. E. Pither, for Radiant Stove, and London Warming and Ventilating Company for Anthracite drawing-room stove. *Highly Commended*—Mr. E. E. Pither for Cooking Range. *Commended*—Messrs. Richmond & Co. for Quaker Grate for Coke (Webber & Price's Patent); Domestic Grates Company for Coke Fire; the Dowsing Radiant Heat Company for Electric Radiator; and Mr. W. P. Berwick, for flaming fire-brick for coke fire. The Report is signed by Messrs. Raphael Medola, F.R.S.; H. A. Des Vaux, M.D.; Stephen H. Ferry, M.Inst.C.E.; Ernest Newton; and G. Wyld, M.D.

THE BUILDING TRADE DISPUTE.

THE quarterly meeting of the Council of the National Association of Master Builders of Great Britain and Ireland was held at Birmingham on the 27th ult. Alderman Holdsworth, of Bradford, presided, and there was a large attendance of delegates from all parts of the country. The proceedings lasted four hours, and were private.

The agenda was long, amongst the items being:—

1. To consider the desirability of having closer relations with the Scottish Building Trades Federation and other kindred associations.
2. To discuss the present position of the plasterers' lock out, the action taken in regard thereto, and to receive the reports of the deputation appointed to meet the operatives in conference.
3. To authorise a general meeting of the association being summoned for the purpose of making a levy, and, if necessary, to define the procedure in connexion with the plasterers' dispute.

In a supplementary agenda the following additional items were added:—

(a) To consider the question of a general lock-out of all trades in connexion with the plasterers' dispute, and to make a recommendation to the various affiliated associations thereon; and

(b) To consider a recommendation to appoint a general organising secretary.

The only information supplied to the representatives of the Press at the close of the meeting was the following resolution, which, it was declared, had been carried unanimously:—

"That this meeting recommends the National Association to ask the whole of the building trades operatives' unions for a definite assurance that they have no sympathy with, and will not support in any way, the National Association of Plasterers in the present dispute, and that, if such an assurance is not forthcoming from all of them by May 6, the question and the terms of a general lock-out shall be settled at a meeting of this Council.'

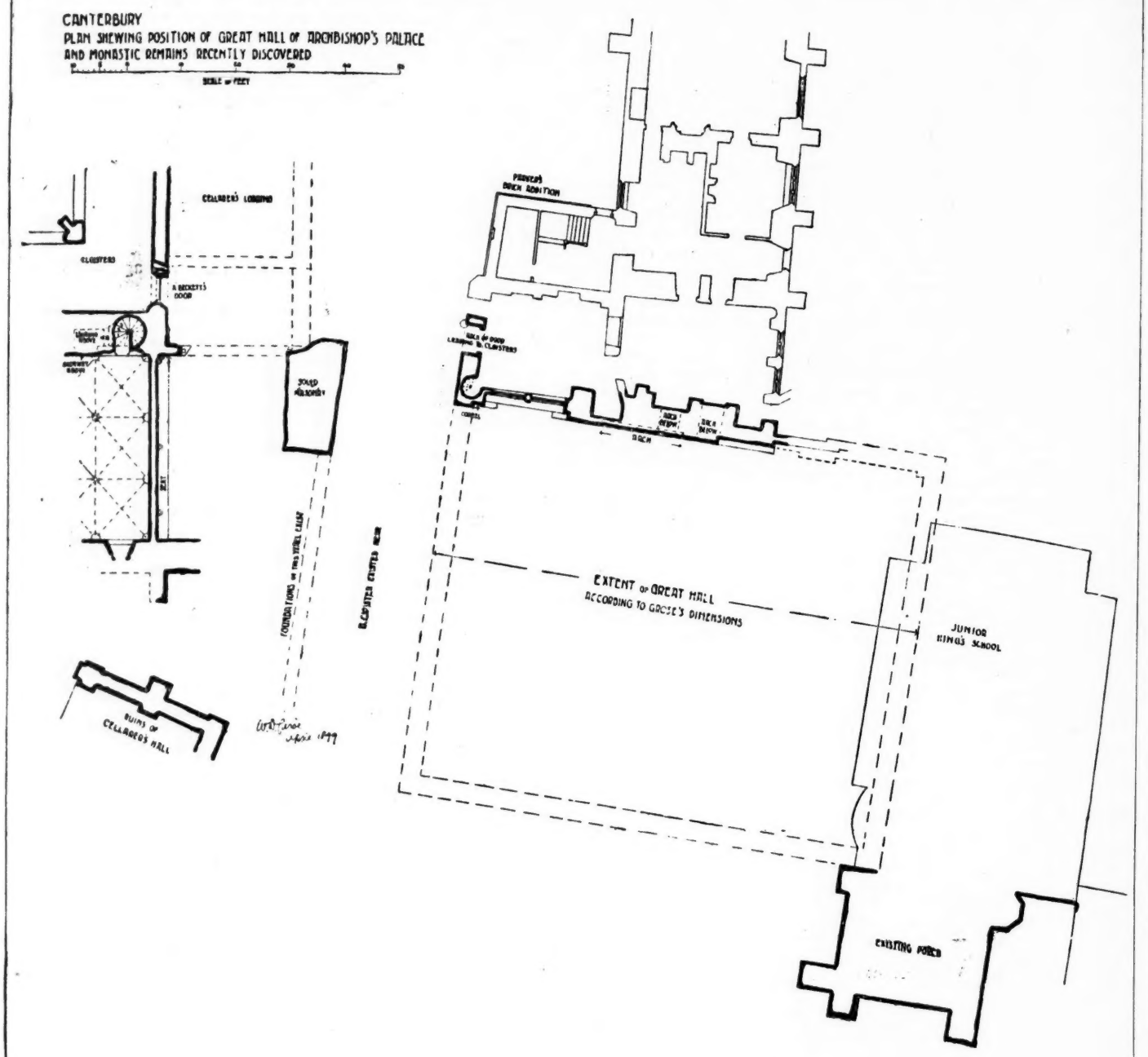
No appointment, it was stated, had been made for any subsequent meeting.

A return was submitted showing that the number of men locked out was 4,116, and that the approximate number of members of the National Association of Operative Plasterers was 10,558.

The Secretaries of the United Operative Bricklayers' Societies, the United Stone Masons' Societies, the Amalgamated General Union and Associated Societies of Carpenters and Joiners, the Amalgamated Slaters' Society, the United Operative Plumbers' Society, the National Association of Operative House Painters and Decorators, and the Builders' Labourers' Union, each received a letter on the 1st inst. from Mr. Hassall, the Secretary of the National Association of Master Builders, conveying to them the terms of the resolution passed at Birmingham. Mr. Hassall states that his Association requires a definite assurance from the building trades' operatives' unions that they will not support the Plasterers' Union in the present dispute.

A meeting, convened by the London district committee of the N.A.O.P., was held at the Memorial Hall, Farringdon-street, on the 1st inst., when the District Secretary stated that the cost of sending back the foreign plasterers was 83*l.* The lock-out, he added, had cost the district 336*l.*, an average of 42*l.* 1s. 3d. per week. This sum is exclusive of the money spent in carrying on the ordinary work of the district. The lock-out pay to the London members had been paid from the general funds of the society, and amounted to 3,000*l.* It was decided to ballot the members as to arranging a levy so as to give a bonus of 5s. to the locked out men. The General Secretary informed the meeting that there were sufficient funds in hand to carry on the dispute for six or seven weeks longer without calling on the trustees.

QUEEN ELIZABETH'S LODGE AT CHINGFORD.—The Corporation of London at their last meeting resolved to spend 700*l.* on the restoration of Queen Elizabeth's Lodge at Chingford. For the last three or four years the large upper room of the lodge, known as the banqueting room, has been utilised by the Essex Field Club as a local museum for the purpose of illustrating the natural history and archæology of the Epping Forest parishes. Mr. J. Oldrid Scott will superintend the reinstatement and repairs.



Illustrations.

THE ARCHBISHOP'S PALACE, CANTERBURY.

AT our request, Mr. Caröe, the architect for the rebuilding of the Archiepiscopal Palace at Canterbury, has sent us the drawings illustrating it (at present in the Royal Academy) and the following historic and descriptive sketch of the buildings, old and new :—

"The ancient palace of the Primates of England at Canterbury has undergone many vicissitudes. Only a somewhat forlorn fragment remains, and in no sense expresses its former magnificence. The late Mr. Cave Browne and Professor Willis have put together materials from which a brief history may be extracted, while the building itself has by investigation yielded up something of its form.

The palace is stated to have been originally the Royal residence of Ethelbert, who, on his conversion in 597, bestowed it upon Augustine. Bede and William of Malmesbury allude to it, the latter relating its sacking by the Danes in 1011, and its destruction by fire in 1067. Lanfranc rebuilt it (1070-89) and it was occupied by à Becket in its form as left by the great founder of the Norman monastery. The far-reaching reconstruction of the thirteenth century, however, seems to have swept all before it, and the sole remnant of masonry which met Becket's gaze as he passed to the martyrdom is the outer arch of the north-west cloister door, called à Becket's door upon the plan.

Lanfranc's work was extended or entirely remodelled by Walter (1193-1205) and Langton (1207-1228), to whom the Great Hall is ascribed, erected for the purpose of affording more worthy hospitality to pilgrims of high estate who visited the shrine of the Martyr. It is not certain that any surviving part yet traced out dates back beyond this work of Walter's. The position and extent of this hall can be laid out conjecturally almost with exactitude.* By excavation, the foundations of all its walls would, doubtless, be readily disclosed. The south external wall still stands in part, but has been turned literally inside out, for it now forms the north external wall of the chief extant remnant of the palace. The hall was a vaulted structure, and was heavily buttressed at each respond, with a vice—in part remaining—near its south-east corner. This appears upon the plan, upon which the subdivision of the bays and the recesses for the windows can also be traced. The fenestration was by coupled windows in each bay, each of two lights. Portions of the wall ribs, caps and bases to the vaulting shafts, and the complete sill of one of the windows in Purbeck marble, much dilapidated, are still *in situ*.

Adjoining the east wall of the hall, and, therefore, between it and an embattled wall which separated it from the monastery, the existence of a cloister is recorded.

The chief entrance to the hall was from a courtyard to the north, approached by a great gateway, still existing, but enveloped by modern houses.

Adjoining the north-west wall of the hall was the tower porch, the lower stages of which exist incorporated in the gaunt brick building of the Junior King's School, which now partially occupies the site of the hall. Subsidiary buildings, probably kitchens, &c., were already attached to the Great Hall on its south side in the thirteenth century. These were subsequently considerably enlarged to something of the form in which we now see them, but were further extended southward with a return wing projecting westward from the south end, the ruins of which are shown upon the view, and will be retained.

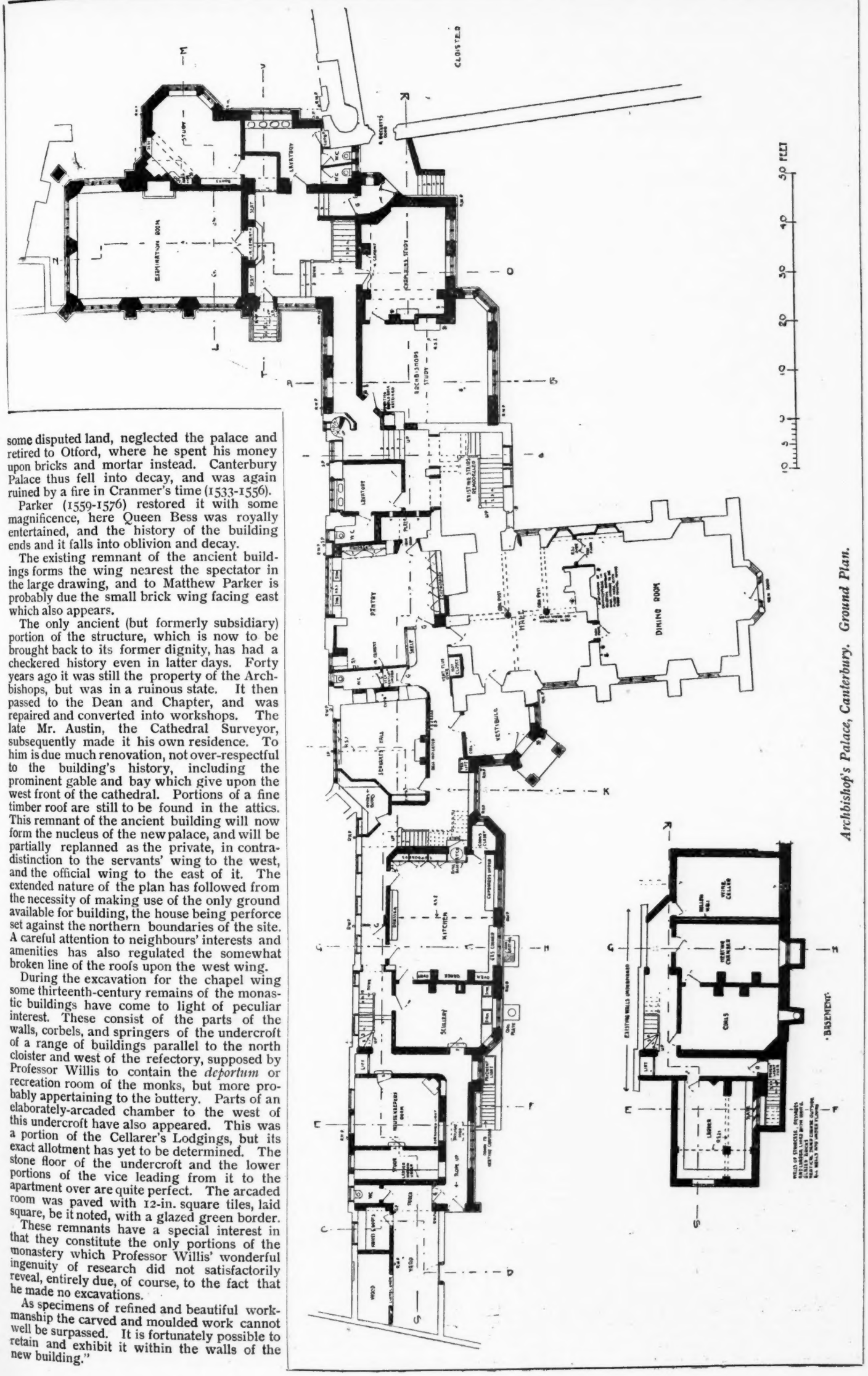
In 1344 and 1349 there are records of the dilapidated condition into which the fabric had been allowed to fall, Archbishop Ufford's executors having to pay his successor Islip no less than 1,100*l.* by way of dilapidation money. Here we find an enumeration of the rooms then existing as follows :—

The Great Hall, the Small Chamber of the Archbishop, the Great Chamber with its kitchen, the Hall of St. Thomas, the Chamber next the Great Chamber, and two other chambers between the Great Hall and Great Chamber, the Great Kitchen, the Great Gate with stables.

Morton (1486-1501) is stated to have added buildings, and Warham (1503-1533) entertained no less distinguished guests here than Henry VIII., Catherine of Arragon, and Charles V. of Germany.

He contemplated grander additions to the fabric, but in disgust with the citizens over

* Unfortunately, by a mistake of the architect's draughtsman, the plan of the existing remains was sent to us with the writing the reverse way of that on the plan of the new work. We are therefore compelled to print it the other way, so that it must be reversed to trace its connexion with the complete ground plan.



Archbishop's Palace, Canterbury. Ground Plan.

some disputed land, neglected the palace and retired to Otford, where he spent his money upon bricks and mortar instead. Canterbury Palace thus fell into decay, and was again ruined by a fire in Cranmer's time (1533-1556).

Parker (1559-1576) restored it with some magnificence, here Queen Bess was royally entertained, and the history of the building ends and it falls into oblivion and decay.

The existing remnant of the ancient buildings forms the wing nearest the spectator in the large drawing, and to Matthew Parker is probably due the small brick wing facing east which also appears.

The only ancient (but formerly subsidiary) portion of the structure, which is now to be brought back to its former dignity, has had a checkered history even in latter days. Forty years ago it was still the property of the Archbishops, but was in a ruinous state. It then passed to the Dean and Chapter, and was repaired and converted into workshops. The late Mr. Austin, the Cathedral Surveyor, subsequently made it his own residence. To him is due much renovation, not over-respectful to the building's history, including the prominent gable and bay which give upon the west front of the cathedral. Portions of a fine timber roof are still to be found in the attics. This remnant of the ancient building will now form the nucleus of the new palace, and will be partially replanned as the private, in contradistinction to the servants' wing to the west, and the official wing to the east of it. The extended nature of the plan has followed from the necessity of making use of the only ground available for building, the house being perforce set against the northern boundaries of the site. A careful attention to neighbours' interests and amenities has also regulated the somewhat broken line of the roofs upon the west wing.

During the excavation for the chapel wing some thirteenth-century remains of the monastic buildings have come to light of peculiar interest. These consist of the parts of the walls, corbels, and springers of the undercroft of a range of buildings parallel to the north cloister and west of the refectory, supposed by Professor Willis to contain the *deportum* or recreation room of the monks, but more probably appertaining to the buttery. Parts of an elaborately-arcaded chamber to the west of this undercroft have also appeared. This was a portion of the Cellarer's Lodgings, but its exact allotment has yet to be determined. The stone floor of the undercroft and the lower portions of the vice leading from it to the apartment over are quite perfect. The arcaded room was paved with 12-in. square tiles, laid square, be it noted, with a glazed green border.

These remnants have a special interest in that they constitute the only portions of the monastery which Professor Willis' wonderful ingenuity of research did not satisfactorily reveal, entirely due, of course, to the fact that he made no excavations.

As specimens of refined and beautiful workmanship the carved and moulded work cannot well be surpassed. It is fortunately possible to retain and exhibit it within the walls of the new building."

LONDON COUNTY COUNCIL MODEL DWELLINGS FOR THE MILLBANK SITE.

WE publish this week the plans of Messrs. Spalding & Cross, who obtained the first premium in the competition recently instituted by the London County Council for the best designs for model dwellings, or dwellings for the poorer class, on their site at Millbank.

The following particulars are extracted from the architects' report sent in with the drawings :—

"In order to ensure the free circulation of air, in view of the fact that the site may be, at any future time, practically enclosed on two sides by lofty neighbouring buildings, it has been found advisable to place the tenements in two distinct blocks of buildings, five stories in height, with their lines of frontages abutting respectively on Earl-street and the vacant land, the surplus portion of the site being utilised as a courtyard or recreation ground. A centrally-placed cottage building for the supply of hot water and for clothes drying has been provided, and also a spacious workshop or bicycle store. The larger block of dwellings, fronting Earl-street, contains the following accommodation, viz. :—

Five two-roomed tenements.

Thirty three-roomed tenements.

The smaller block of dwellings, fronting the vacant land at the eastern boundary of the site, contains (No. 20) two-roomed tenements.

The following detailed description of the general arrangement and construction applies equally to both two-roomed and three-roomed tenements.

Each tenement is approached by means of the general staircase, from the landing of which access is obtained to the private entrance lobbies of the various self-contained tenements, consisting of a living room, having a floor area of not less than 160 ft. superficial, overlooking the street and fitted with a dresser, with two shelves, potboard and cupboard, and a self-setting range for an open or close fire. A bedroom, or bedrooms, having a minimum floor area of 106 ft. superficial, fitted with a hanging cupboard for clothes and a mantel register stove. A scullery, overlooking the court-yard and disconnected from the living and bedrooms by the ventilated entrance-lobby and the adjoining balcony, containing a floor area of not less than 45 ft. superficial, and fitted with a stoneware sink, a draining-board, a plate-rack, a six-gallons copper and an open cottage range, so that, if thought desirable, the scullery could be used as a kitchen.

The scullery, the water-closet, the galvanised iron coal-box, and food store, the dust-pails, &c., are all accessible from the balcony, to enable any necessary sanitary inspection or replenishment of stores to be made without disturbing the privacy of the inmates and to allow of any household washing and clothes drying being carried on without discomfort.

Construction.—The buildings generally would be constructed of fire-resisting materials—all the walls being of brick, and the floors formed throughout with steel joists filled in with coke breeze concrete. The roofs would be boarded and felted and covered with green slates.

All external walls would be faced with Lawrence's red facing bricks above a high dado of salt glazed bricks. Light red terra-cotta would be used for the copings to the gables, the window cills, and the front doorways, &c.

The walls of the staircases, sculleries, and water-closets would be faced with salt-glazed bricks throughout.

The walls of the entrance lobbies, living rooms, and bedrooms would be plastered, in the cases of the lobbies and living rooms, above the dado, which would be of salt-glazed brick. The staircases, balconies, &c., would be of granolithic. The window balconies would have wrought-iron flower-guards, and the yard balconies wrought-iron fence rails as shown upon the drawings. The water-closets would be fitted with the 'Oatley' patent overflow soil and anti-siphonage pipe junction, so that should one water-closet become blocked, the others would not be put out of action or the water-closets at a lower level flooded. The rain-water pipes and sink wastes would discharge into gullies having cleaning caps to enable all short lengths of drains to be cleaned. The general drainage arrangements are planned in accordance with the revised by-laws proposed to be made by the Council. The whole of the water used would be stored in 'Alexander's' patent self-cleansing air-tight cisterns placed in the roof-space immediately over the staircases, and easily accessible. The arrangements suggested for the general supply of hot water and for clothes drying are clearly indicated on drawing No. 2. The general dust-bins would be of galvanised iron."

ST. MARY WOOLNOTH, LOMBARD-STREET.—It is rumoured that the Bishop of London has in preparation a scheme for uniting the benefices of St. Mary Woolnoth and St. Edmund the King, Lombard-street, and for pulling down the former church and selling the site. A railway-station has recently been constructed beneath the church, but its removal would be a yet greater vandalism.

THE SURVEYORS' INSTITUTION.

The annual provincial meeting and conference in connexion with the Surveyors' Institution was opened on the 26th ult. at the Council House, Bristol. There was a representative gathering of members from various parts of the country. The arrangements were admirably carried out by the following gentlemen on the Somerset, Gloucester, and North Wilts Provincial Committee :—Messrs. H. A. Hood Daniel, P. Munro, P. Addie, T. Scammell, W. Sturge, R. F. Sturge, A. P. I. Cotterell, and T. Sturge (Bristol), C. R. Wainwright, E. M. Hippisley, and H. Spackman (Somerset), H. W. Bruton, J. J. Harle, and R. Anderson (Gloucestershire), H. H. Smith, H. B. Napier, and L. H. Marshall (North Wilts). The members were received at the Council House by the President of the Institution, Mr. Robert Vigers, and when they had assembled in the Conference-room the Mayor (Mr. Herbert Ashman) temporarily took the chair for the purpose of affording an official welcome.

On the motion of Mr. Robert Vigers, the members of the Institution thanked the Mayor for his remarks, and for the great trouble he had taken in connexion with the visit of the Institution to Bristol.

The chair was afterwards occupied by Mr. Robert Vigers.

Mr. William Sturge, a past President of the Institution, read a paper dealing with past and present Bristol. Having given some historical information relating to the city, he said that "Bristol is admirably supplied with water. The Bristol Water Works Company obtained an Act of Parliament in 1846 authorising them to obtain supplies from springs at Chewton Mendip, fourteen miles from Bristol, as well as from other sources, and to construct reservoirs at Barrow Gurney, five miles from Bristol. Several more recent Acts have been obtained in order to increase the supply. The company's three store reservoirs at Barrow occupy about 130 acres, and are placed at an elevation which admits of the flow of water by gravitation to all but the highest parts of the city. There is a low service reservoir at Clifton, from which the water is pumped to a high service reservoir on Durdham Down. There are also a deep well and pumping station at Chelvey, ten miles from Bristol, to supplement the supply in dry seasons, with the result that through the drought seasons of recent years a constant supply was maintained. In view of the increasing population of the city, the company are now constructing a reservoir of several hundred acres at Blagdon on the river Yeo, twelve miles from Bristol. The total expenditure of the company on works is about 1,680,000*l.*, and the water revenue is about 114,000*l.* per annum. I have acted as the company's surveyor in the purchase of land and wayleaves for pipes from the date of its formation to the present time. The city is well lighted with gas ; the total capital of the Bristol Gas Company is 1,426,950*l.* ; the gross revenue is 134,636*l.* The present price of gas to consumers is 2s. 4d. per 1,000 cubic ft. The Corporation has erected electric light works in Temple Backs and some of the leading thoroughfares, and many shops and places of business are lit with the electric light. . . .

As might be expected in an ancient walled city, the streets of Bristol were much too narrow for the requirements of modern traffic. For many years after the construction of the principal railway station in Temple Meads, the only approach to the centre of the city was by Temple-street, a narrow and mean-looking thoroughfare. Redcliff-street, the principal carriage access from the west, was so narrow that the heavy traffic often blocked the street. Between the year 1866 and the present time great improvements have been carried out under various Acts of Parliament by means of loans for terms of years, raised on the security of the borough rates. These improvements, notably Victoria-street, New Baldwin-street, Redcliff-street, Perry-road, Colston-street, and many minor schemes have been carried out at the cost of upwards of half a million, of which outlay a large proportion has been recouped by the sale of salvages.

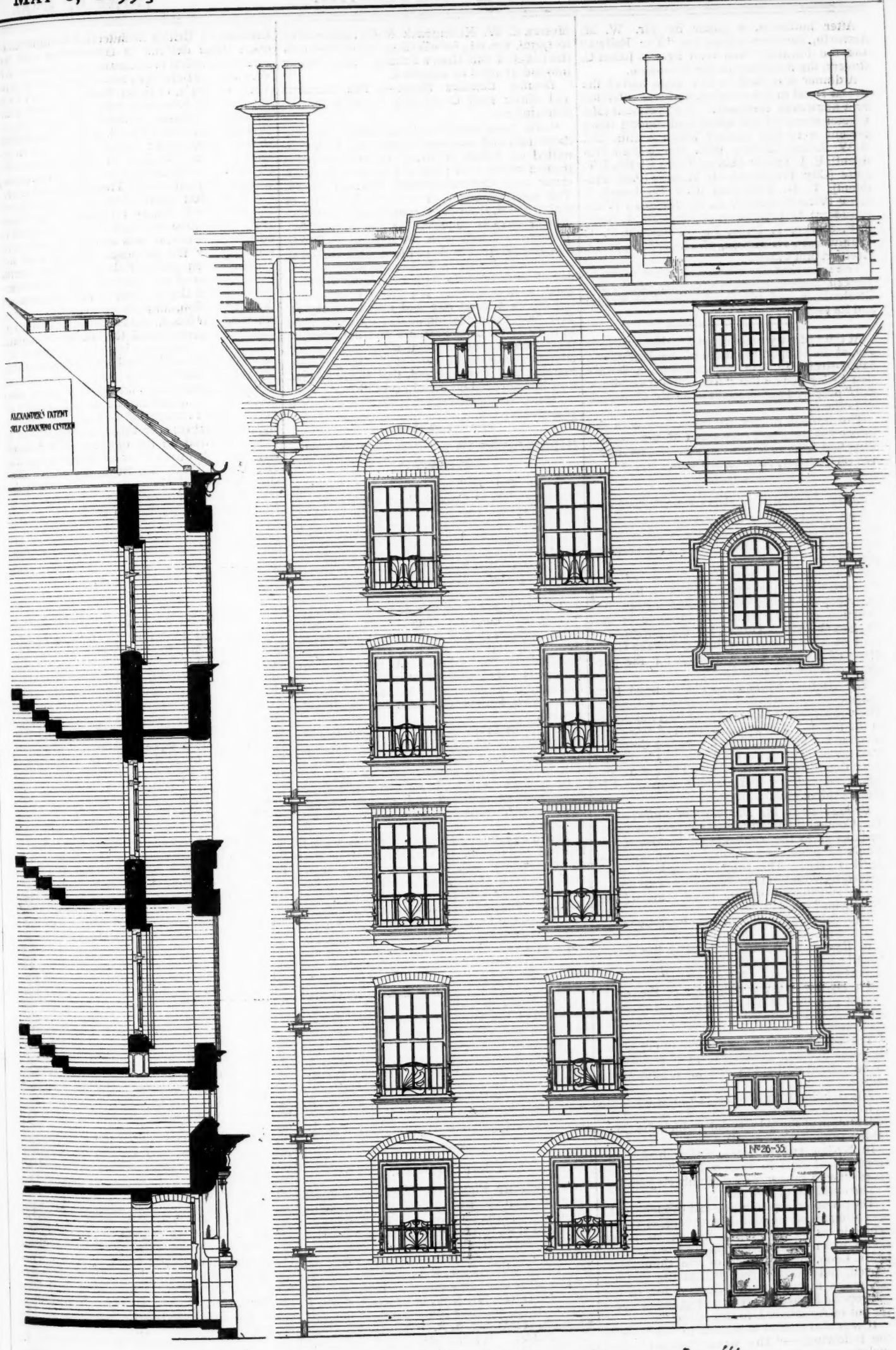
There is in Bristol no great dominating proprietor able to dictate the tenure on which land shall be granted for building. By far the greater part of the property is held by a numerous body of proprietors on freehold tenure free from ground rent, or subject only to a small quit rent. The system of granting land for building on leases for ninety-nine years does not prevail, and is regarded with such disfavour that for residential purposes this tenure is almost unknown. The usual practice is to grant land for building in perpetuity subject to ground-rents locally known as 'fee farm rents.' Well-secured ground-rents could formerly be purchased for twenty, twenty-two, or twenty-five years' purchase ; they now freely realise from twenty-eight to thirty years' purchase. The Corporation of Bristol is the largest property owner in the city, owning property producing about 20,000*l.* per annum, besides the docks and markets. Some of their property is granted on the antiquated tenures prevalent two centuries and a century and a half ago. Queen-square and Prince-street, and other places were granted on leases for forty years, renewable for ever on payment once in every fourteen years of 'one full year's rack rent or yearly value,' subject to applications for renewal being made within one year after the renewal becomes due, and to the premises being kept in repair. The effect of this tenure is to bar almost all improvements for fear of increased fines. Much of the Corporation property was formerly held by lessees for lives, and previously to the year 1849 it was the practice to put in new lives on payment of an arbitrary fine, but this was not compulsory. In that year all the lessees were offered to commute their life leases into the term of seventy-five years absolute, on payment of an additional reserved rent calculated on the difference in value. Many, but not all, the lessees availed themselves of this offer. There are still a few outstanding life leases, which are allowed to fall in hand as the lives drop. A good deal of property in the ancient city is owned by charitable foundations and parochial vestries, which, owing to the delay and restrictions in granting building leases, is for the most part the least improved property in the city.

The value of property in the principal business streets has very largely increased during the last twenty years ; in Corn-street and Clare-street, where most of the banks and insurance offices are situate, transactions have taken place at from 50*l.* to 65*l.* per yard super, including buildings a century old, in most cases taken down to clear the site. In one case of a corner plot, about 110*l.* per yard was paid. In New Baldwin-street the average ground-rent has been 10s. per yard, and one corner plot 13s. 4d. per yard. In Wine-street (the chief seat of the drapery trade), a plot of vacant land containing 204 square yards realised by auction last year the ground-rent of 25*l.* per annum, equal to 1*l.* 4s. 6d. per yard, which at thirty years' purchase amounts to 36*l.* 15s. per yard in fee. An adjoining plot of 251 yards, with larger frontage, realised the ground-rent of 38*l.* per annum, equal to 1*l.* 10s. 3d. per yard, worth, at thirty years' purchase, 45*l.* 7s. 6d. per yard in fee. The rents of shops and business premises in the main streets have been steadily rising. A house in Clare-street, which sold for 6,000*l.* ten years ago, has just been re-sold for 9,000*l.*, an advance of 50 per cent. On the other hand, the rents and selling value of residential property in Clifton have depreciated 20 to 25 per cent. within the last twenty years, especially those of the larger and older houses, not adapted to modern requirements. In the case of more modern houses, I think the heavy ground-rents (often equal to one-fourth of the rack-rent) affect the market value. There is less disposition than formerly to purchase houses for investment. Waterside property has increased in value. Under the compulsory powers of the 'Bristol Dock Act, 1897,' the Corporation purchased last year 11a. 3r. 0p. of waterside property for 69,350*l.*, being at the rate of 5,900*l.* per acre."

Mr. T. M. Rickman (London), Vice-President, proposed a vote of thanks to Mr. Sturge for his paper, and Mr. John Shaw (Derby), Vice-President, seconded the motion, which was heartily agreed to, and Mr. Sturge replied.

Mr. Howard Martin (London) then read a paper on Mr. Chamberlain's Bill to enable workmen to purchase their dwellings. In the discussion the following gentlemen took part :—Messrs. Daniel Watney (London), Past President, who proposed a vote of thanks ; Mr. R. Horsfall (Halifax), Mr. T. T. Wainwright (Liverpool), Mr. D. Ward (Plymouth), and the President. The general feeling was that the Bill was unworkable and that building societies were doing all that was necessary.

The vote of thanks was agreed to and Mr. Martin replied.



The Proposed Millbank Model Dwellings. Detail Elevation.

[*See preceding page.*

After luncheon, a paper by Mr. W. M. Acworth, barrister-at-law, on "The Railway and the Farmer," was read by Mr. Julian C. Rogers, the Secretary of the Institution.

A dinner was held in the large hall of the Grand Hotel in the evening, and was attended by a numerous company. The President (Mr. Vigers) occupied the chair, and among those present were His Honour Judge Austin, Col. G. W. Raikes, Messrs. Wm. Sturge (Past President), E. J. Taylor (Acting Town Clerk), J. T. Lane (City Treasurer), D. Watney (Past President), T. H. Yabbicom (City Engineer), J. Shaw (Vice-President), T. M. Rickman (Vice-President), G. Langridge, R. Horsfall, A. Buck, R. F. Sturge, T. Dyke, F. W. Newton, T. T. Wainwright, H. Martin, C. H. Bedells, H. M. Grellier, and others.

The following day excursions were made to Tintern Abbey, Chepstow Castle, Wells, and Glastonbury, and places of interest in Bristol and its vicinity.

At the ordinary meeting in London, on Monday, at the temporary offices of the Institution, Savoy-street, Victoria Embankment, a discussion took place on the "Agricultural Holdings Bill," prepared and brought in by Mr. Channing and others.

The annual dinner in connexion with the Junior meetings will take place at the Monico, Egyptian Saloon, Shaftesbury-avenue entrance, W., on Tuesday, May 30, at 7 p.m.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday, at the County Hall, Spring Gardens, Lord Welby, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend the St. Luke, Middlesex, Vestry 5,000*l.* for the construction of underground conveniences; the Chelsea Guardians 11,060*l.* for the purchase of land as a site for a workhouse, and the Guardians of Stepney Union 10,550*l.* for the purchase of a site for schools.

The Annual Estimates.—The Council then considered and adopted the annual estimates. The county rate is to be reduced by a halfpenny in the pound. The principal item of increased revenue is a profit of 78,935*l.* from the Council's tramways. The debt of London has increased since the existence of the Council by 4,000,000*l.*, but about half of that amount is invested in remunerative undertakings.

By-laws as to the Drainage of Buildings.—The Council then considered the proposed new by-laws as to the drainage of buildings, the whole of which we printed in our issue for April 1 last. The proposed by-laws were agreed to, with the following alterations:—

The substitution of the word "metal" for "cast iron" in all cases.

The deletion of the words "semi-vitrified ware" in all cases.

In By-law 3, Appendix I., after the words "shall cause such pipe or channel to discharge," insert the words "into the open air."

To By-law 8 (IV.) add, "Or if the drain exceed 4 in. in internal diameter by a sectional area not less than that of a pipe 4 in. internal diameter."

The withdrawal for the present of (VI.) from the same by-law. Another form of wording is to be submitted by the Public Health Committee.

The deletion from By-law 11 of the schedule as to thickness and weight of soil pipes and the substitution of the old schedule (which the Committee proposed to repeal).

In By-law 11 (soil pipes, material) after the words "soil pipe in drawn lead," insert the words "with proper wiped plumber's joint."

The omission of By-law 22.

The proposed repealing by-law (Appendix II.) was also agreed to, with the exception of the schedule as to soil pipes, which, as stated above, was re-incorporated in By-law 11.

Mr. Leon, the Chairman of the Committee, moved, and it was agreed, "That the Council do make by-laws under Section 202 of the Metropolis Management Act, 1855, in the terms set out in Appendix I. to this report."

It was also agreed to include in the by-laws the following:—"The word 'person' shall include anybody, whether corporate or incorporate."

King's Scholars' Pond Sewer Pumping Station.—The Main Drainage Committee recommended, and it was agreed, that the tender of Messrs. C. W. Killingback & Co., amounting to 1,970*l.* 13s. 6d., for effecting alterations near the outlet of the King's Scholars' Pond sewer into the Thames be accepted.

Theatre, Camden Town. — The Theatres and Music Hall Committee brought up the following:—

"We have considered ten drawings, nine dated 14th and one dated 26th April, 1899, submitted on behalf of Mr. E. G. Saunders, of a theatre which it is proposed to erect in High-street and Crowndale-road, Camden Town. The total boundary of the site is 501 ft., of which 220 ft. front to thoroughfares of a width greater than is required by the regulations. To comply strictly with the regulations 250 ft. 6 in. should front to these thoroughfares, but to compensate for the difference of 30 ft. a frontage of 75 ft. is given to a cul-de-sac which is about 22 ft. in width. We are of opinion that the site is a good one and may be accepted. The theatre will accommodate 1,590 people, and as regards its arrangements and construction the drawings show the regulations to have been complied with in all respects." They recommended, and it was agreed, that the ten drawings be approved on certain conditions.

Having transacted other business the Council adjourned.

IMPROVEMENTS AT COVENT GARDEN THEATRE.

WITH the end of this week, various improvements at Covent Garden Theatre will practically be completed, and, in order to avoid any exaggerated expectations (owing to the unauthorised and exaggerated reports of what is being done), the following particulars are given, which may be taken as authoritative.

As far as the auditorium is concerned, a new red silk proscenium curtain is to be provided, and will be hung on the lines of a so-called "Wagner" curtain. The porch, vestibule, grand staircase, and saloon, are being redecorated, and the electric light has been installed in the saloon. A new smoking lounge is being erected over the porch from the designs of the surveyor to the Duke of Bedford. This lounge will also be electrically lighted.

Of various minor improvements in front of the house, the whole of the sanitary arrangements have been remodelled and an installation on modern principles provided.

In respect to the stage, the scene stores have been re-modelled and a large "wing" store formed. This will facilitate the change of scenes.

The most important alteration of the stage is the full installation of electric light in four colours—white, red, blue, and yellow being used—and the supply is to be taken from two distinct sources with the view of meeting emergencies. The system accords with the ordinary practice of the London stage and has been put in by Mr. Bowles. A new feature, arranged by the directors is, however, the position of the regulator room below the stage, with a full view of the scene.

The whole of the works have been carried out at great pressure under the personal direction of the Directors, and of Mr. Edwin O. Sachs, their technical adviser. Possession of the Opera House was given to the syndicate on March 25, so that the property has been in the hands of the syndicate for one month only.

There will be no new stage machinery this season, nor will the auditorium be lighted by electricity; the time at the disposal of the directors having been too short for these works.

COMPETITIONS.

CARTWRIGHT MEMORIAL HALL, BRADFORD. Lord Masham visited Bradford on Tuesday to approve the plans for the Masham-Cartwright Memorial Hall, towards the erection of which in Lister Park, Bradford, he has contributed 400,000*l.* He approved the selection made by Mr. Alfred Waterhouse, R.A., and the awards for the plans were announced as follows:—1st premium (150*l.*), Mr. J. W. Simpson and Mr. J. Milner Allen, 10, New Inn, Strand, W.C.; 2nd premium (100*l.*), Mr. A. R. Jemmett, 21, Great College-street, Westminster; 3rd premium (50*l.*), Mr. W. A. Pite and Mr. R. S. Balfour, 3, Upper Montague-street, W.C. The designs will be on view from the 8th inst. to the 13th, in the Museum, at the Technical College, Bradford.

GRAMMAR SCHOOL HOUSE, DONCASTER.—Mr. Alfred Aitchison, nominated by the Royal Institute of British Architects, has adjudicated upon these designs in competition and has awarded the first premium of 50*l.* to Messrs. R. & W. Dixon, of Barnsley; second premium (25*l.*) to Mr. J. B. Royle, of Green-lanes, Finsbury Park, N., and the following were honourably mentioned: — Messrs. Seward & Rawcliffe, of Preston, Lancashire; L. H. Dutch, John Dalton-street, Manchester; Taylor & Son, of Aylesbury; James Withers, of West Bromwich; F. W. Edwards, Newhall-street, Birmingham; Sharpe & Quail, of Old Trafford, Manchester.

SHOREDITCH TOWN HALL.—At a meeting of the Shoreditch Vestry on Tuesday the Town Hall Committee reported that in response to advertisements four sets of designs had been received for the proposed extension of the present town hall buildings. After careful consideration of the various designs the committee stated that, subject to the conditions of the competition, they placed as first in order of merit design No. 2, and as second design No. 3, and they recommended the Vestry to confirm that award. In proposing the adoption of the recommendation Mr. Hall recalled the fact that the Vestry had offered 50*l.* for the set of designs placed first, and 25*l.* for those allocated by the committee as second in order of merit. The recommendation of the committee was then put to the meeting and was adopted. It then transpired, on the opening of the sealed envelopes, that the author of No. 2 design was Mr. W. J. Hunt, 12, Bedford-gardens, Kensington; and of No. 3 design, Messrs. Spalding & Cross, of Cheapside. The author of No. 1 design was found to be Mr. C. Bell, of Cannon-street; and of No. 4 design Mr. C. E. Jackson, 39, Wigmore-street. The Vestry decided to leave for future consideration the question of a final selection of the design for the extension of the town hall.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL SOCIETY.—On the 26th ult., Mr. Frank W. Deas read a paper entitled, "Notes on Romanesque and Byzantine Churches of South-east Italy." Mr. Alfred Greig, Vice-President, occupied the chair. After briefly sketching the history and character of the Province of Apulia, typical churches of the eleventh, twelveth, and thirteenth centuries were described. The work under review owed its charm to a blending of Romanesque, Byzantine, Saracenic, and Norman elements. Many exteriors remain untouched, but examples of interiors are fragmentary. The buildings are of the Basilican type, consisting of naves with wide aisles and apsidal east ends and transepts, the height of the nave, but not breaking the aisle walls on plan. The nave is usually roofed with wood, and the aisles groined. Domes occur, but not frequently. The arcades are heavy, with small arches and many pillars. Window openings are small. Buttresses occur only as pilasters on the west fronts. Thus the exteriors are simple and broad in treatment, setting off to good advantage what carving occurs. The carved ornament is greatly in advance of contemporary work elsewhere. Figure sculpture is still on a low level, however. The paper was illustrated with diagrams and lime-light views.

LIVERPOOL ARCHITECTURAL SOCIETY.—The annual meeting of the Liverpool Architectural Society was held on the 1st inst. in the Law Library, 41, Castle-street, Mr. W. E. Willink, the President, in the chair. The annual report, submitted by Professor Simpson, hon. sec., showed that the number of members was 136, compared with 131 last year. There were fifty-nine Fellows, thirty-seven Associates, nineteen students, and twenty-one honorary members. The balance-sheet, presented by Mr. James Dod, hon. treasurer, showed that there was a favourable balance of 138*l.* 7s. 8½d. as against a balance in hand last year of 67*l.* 10s. 4½d. The election of officers resulted as follows:—President, Mr. E. A. Ould; vice-presidents, Messrs. William Owen and J. Woolfall; hon. secretaries, Professor F. M. Simpson and Mr. Arnold Thornely; hon. treasurer, Mr. James Dod; and hon. librarian, Mr. J. W. Blakey. The Council were appointed as follows:—Messrs. J. W. Blakey, T. E. Eccles, A. P. Fry, Henry Hartley, P. C. Thicknesse, W. E. Willink, J. Woolfall, F. E. P. Edwards, and E. P. Hinde. The outgoing President, Mr. Willink, afterwards delivered his closing address, in which he congratulated the members of the Society upon the success which had attended the work of the past year.

Correspondence.

To the Editor of THE BUILDER.

ARCHITECTURE A FORGOTTEN ART.

SIR,—Not very long ago certain Royal Academicians and other praiseworthy gentlemen beat the air, flogged the Institute, and hugged themselves over the conundrum of whether architecture was "a profession or an art." The performance was an interesting one, but I doubt if it settled much ; such discussions seldom do, as facts remain unaltered by them, *e.g.*, the designer of St. Paul's Cathedral was called a "surveyor," the decorator of the same building is called an "artist," and architecture is called an "art" ; but where are we after all

The design of St. Paul's is good, its decorations are bad, and architecture is such a poor thing that the President of the Royal Academy of Arts did not think it worth while even to mention her at the "Academy Banquet" last Saturday. It is a small matter no doubt, but very curious. Any poor little daub which may find its way on to the walls of the Academy is a work of art, and its author is an artist ; but architecture is a forgotten art !

Painting and sculpture were well taken care of by Sir Edward Poynter. In his reference to the coming Paris Exhibition he expressed a hope that the fine art section would be of a quality to place our school of painting and sculpture in the most favourable light (I hope so too). Later, music and the drama were held up as being "the complement to the arts of painting and sculpture," but nothing was said of architecture, which at least used to be the oldest of the fine arts represented by the Royal Academy.

Two fine paintings have been added, we were told, by Government aid, to our National collection, and we are all proud to hear it. (I wonder how many "artists" ever cross the threshold of the National Gallery). Two fine buildings, however, are about to be erected in Whitehall by the Government ; are these to be no addition to the art treasures of the nation ? If not, had not the Academy better see to the matter at once ?

I quite see that from the very nature of the work of the architect it is impossible adequately to represent it on the walls of Burlington House. I do not see, however, why architecture should be so thinly represented in the ranks of the Royal Academicians, neither do I see why work which is at least as good as that of the painter and sculptor, should be so constantly overlooked by the Academy.

Cannot the gentlemen to whom I first referred persuade the President of the Academy that architecture really is an art still ? This should not be a very difficult task, as I am told Sir Edward's father was an architect himself.

LEONARD STOKES.

THE EDINBURGH ADVERTISEMENTS BILL.

SIR,—Will you permit me, with reference to your sympathetic note on the advertising clauses in the Edinburgh Bill, to offer a reassuring explanation ?

The only power denied to the Corporation is one which they did not ask for—that is to say, a censorship of individual posters ; subject to certain equitable conditions with regard to existing interests, the municipality have obtained powers which, in the judgment of this Society, will be of far-reaching efficacy for the prevention of disfigurement.

We regard the decision of the Select Committee as the permanent recognition of the principle which for five years we have been struggling to assert, and we can confidently trust to time for the application of it elsewhere in conformity with local requirements.

Our warmest thanks are due to the Lord Provost and the Corporation who have fought our battle with so much spirit and wisdom.

RICHARDSON EVANS,
Hon. Sec. National Society for Checking the Abuses of Public Advertising.
1, *Camp View, Wimbledon Common.*

BRICK STREET PAVING.

SIR,—With reference to your paragraph in last week's issue on the above subject, I should like to make a slight though important correction as to the abrasion test carried out by me. The bricks placed in the tumbler or rattler were equal to 15 per cent. of its cubic contents, but some of these were of other than Messrs. Woolliscroft's manufacture.

It is important in testing for abrasion and impact that the cubic capacity of the bricks or filling should bear some relation to the capacity of the rattler, and your note might lead readers to suppose that only five bricks were put in, whereas there were nineteen used in the test.

If any of your readers are interested in the subject of "brick-paving for roads," they can see three samples, made by different well-known firms, laid and in use in Upper-street, Islington, a short distance beyond the Agricultural Hall. These pieces of paving have been laid by the Islington Vestry under the superintendence of Mr. J. P. Barber, M.Inst.C.E., their Surveyor, and time will prove whether the merits claimed for this class of paving, which is now being so largely adopted in America, are justified. At any rate the experiment will doubtless be watched with interest not only by engineers and surveyors having charge of highways but the public who use the roads.

JOHN T. EAYRS, M.Inst.C.E.

FOUNDATIONS NEAR THE SEA.

SIR,—Perhaps some of your numerous readers will answer the following queries, viz. : What is the best treatment for foundations at a seaside resort, when you have to contend with quicksand and beds of shell, caused by the back-wash from the sea ? I shall be much obliged to any professional brother who has had any experience of the kind if he will give me his ideas.

FRANK HOLMES.

The Student's Column.

ARCHITECTURAL HYGIENE.

XVII.—VENTILATION (*continued*).

6.—INLETS.

THEIR *Position and Size.*—There is a considerable difference of opinion as to whether the inlets should be at the top of the room or low down, but the best position seems about 6 ft. from the floor level, and if possible on the same side of the room as the fireplace.

Inlets should be so arranged as to draw the air from a pure source. They should be short and accessible, otherwise they collect dirt and vermin, for what is the use of admitting air if before it reaches the apartment it becomes fouled by accumulations of dirt ? The air is introduced about 6 ft. from the floor, so as to give the air an upward direction above the heads of occupants. Inlets should be well distributed, so that all parts of the room may be air cleansed. The incoming air should, of course, be warmed in winter, but in ordinary houses where this is not done the inlets should be distributed so as to diffuse and mix with the air of the room before it reaches the occupants. Inlets should be capable of partial closing.

Air may be introduced through a Sherringham's ventilator (fig. 201), which is much better than an ordinary grating, because it is provided with flaps falling inwards, and with cheeks, so that the air is forced upwards first and then diffused. The "Harding" diffuser can be placed in its mouth, and this spreads the stream of the air.

Figs. 202 and 203 show respectively a view and section of a very good inlet ventilator patented by Mr. Joseph Leather, of Liverpool. It is on the same principle as the "Sherringham," but is a decided improvement on it. It will seen by the section fig. 203 that the cheeks are divided into four compartments, the bottom two being covered with perforated zinc, marked D in the figure.

This is to stop the air from coming into the room in too draughty a course, and tends to drive the air up in a vertical direction through the two upper compartments, and at the same time prevents any dirt or rubbish from getting into the room. The ingress of the air can be regulated by the movement backwards and forwards of the flap.

Figs. 204 and 205 show another example of an inlet ventilator, which is called the "Venetian Louvre Ventilator," and it is also patented by Mr. Joseph Leather.

Fig. 204 shows the ventilator open, and the working arrangement is as follows :—

The centre top and bottom louvres A, B, and C are fixed, and by pulling the handle down the two louvres D and E (which move in conjunction on a plate fixed to the centre F) are brought on to B and C, as shown in fig. 205, which shows the ventilator closed.

This form can be recommended, and it has the advantage of being arranged in the thickness of the wall, and no flap is visible on the inside of the room when the ventilator is open. Both these forms of ventilators are being extensively used in London and the provinces.

A "Tobins" tube inlet (fig. 206) is an upright tube placed at the side of the room, formed of 1¼ in. boarding, and lined with zinc. Its top should be at least 6 ft. from the floor, so as to prevent people feeling a draught. It is provided with a butterfly valve to regulate the admission. The disadvantage is the long tube, which is difficult to clean. The top is covered with perforated zinc, marked H in the figure.

We cannot condemn too strongly the placing of hot-water pipes below a floor level, covered by gratings ; such ducts become the receptacles of all sorts of filth, which dries into dust and is carried about by the air current set up, and contaminates the atmosphere to be breathed.

A form of inlet which should be provided to every room is made by placing a deep bead on the ordinary sash window (as shown in fig 207), the air being admitted between the meeting rails in a vertical direction. Fig. 208 shows the introduction of fresh air at the head of the window. The supply can be regulated by the soffite lining having a hinged flap.

When the temperature of the outer air is below 45 deg. it is found by experience that inlets get closed unless the air is warmed. This is done by passing it over ventilating radiators, which are illustrated in examples given in another chapter. In smoky towns, the incoming air is often cleansed by passing it through a screen of cotton wool, or horsehair and fibre, upon which in some cases a sheet of water is poured at short intervals. This screen arrests the impurities, which are washed off by the water.

Size of Inlets.—Dr. Corfield states that 24 square inches is the sectional area which should be allowed as an inlet for each person ; so that one square foot is required for six persons. Therefore six air bricks of the effective area of 24 square inches would be sufficient for six persons. Such an allowance seems excessive, and in fact is seldom obtained in practice. It is considered advisable to give the inlets a larger area than the outlets as this reduces the velocity of the inflowing current. In calculating the size of the openings, the actual opening only must be counted, deducting bars and other obstructors, &c. The late Professor Jacob was of opinion that in calculating the size of openings, one square inch of unobstructed space will, as a maximum, admit 125 cubic feet of air per hour ; on this basis eight square inches would admit 1,000 cubic feet, which in rooms not continuously occupied and introduced at a velocity of not more than 5 ft. per second may be considered sufficient for each person. This, however, is just one-third of Dr. Corfield's calculation.

The tendency is for inlets to be too small, considering the low motive power in natural ventilation. The Education Department require inlets of a minimum allowance of 2½ square inches per child.

The Army regulations provide for inlets and outlets varying from 10 to 20 square inches per head ; but in all cases the ratio of inlets and outlets to cubic space are as 1 is to 60.

Hood's Rule.—For ordinary rooms provided with a good fireplace, Hood propounded a practical rule based on experience, taking into account the size of the room, the number of occupants, and the gas burners, &c. :—

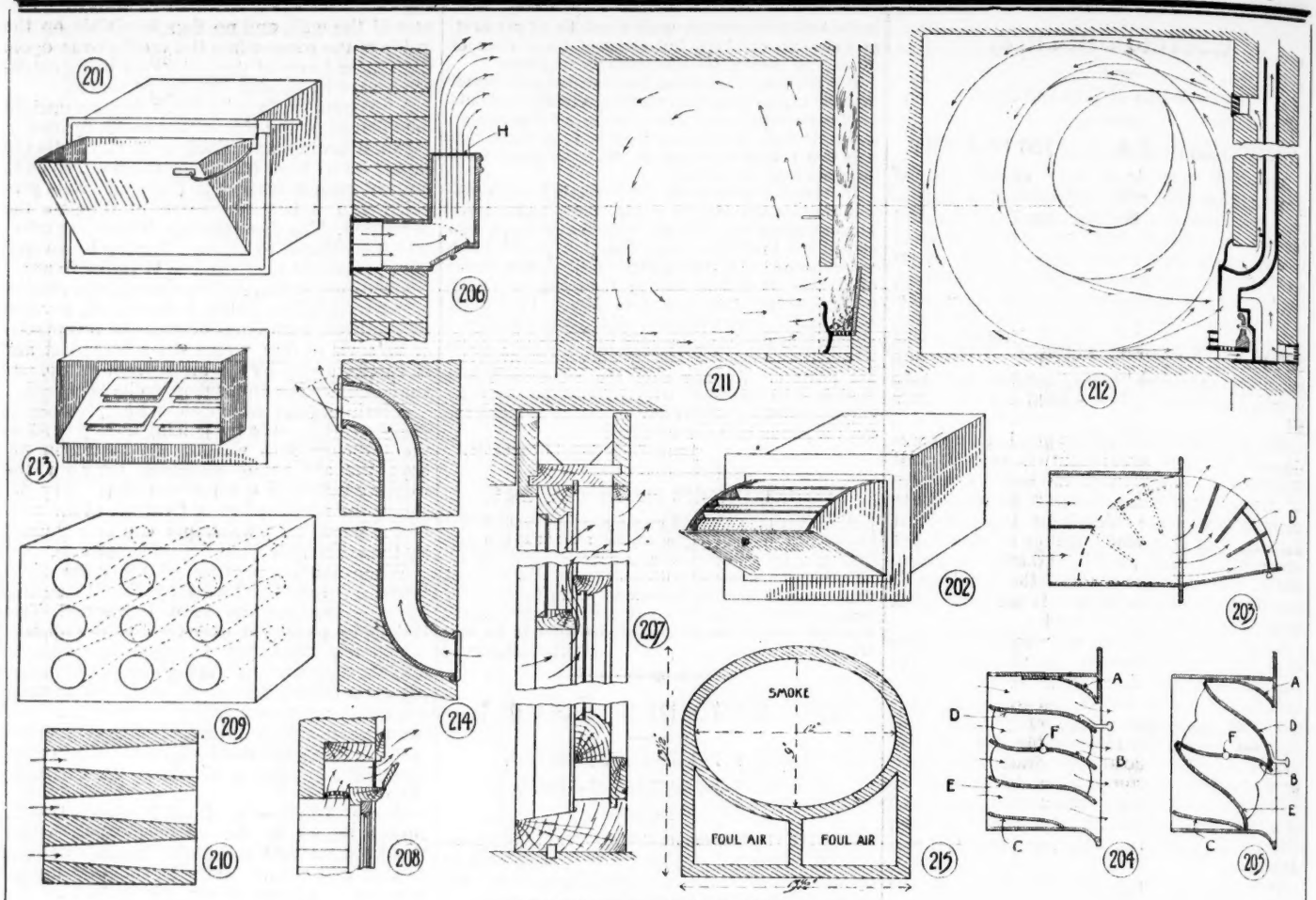
Size of Room.		Number of Occupants.	Number of Gas Burners.	Net Size of Ventilator.
ft.	ft.			in. in.
10 by 10	...	2 or 3 ...	2 ...	9 by 3
16 by 12	...	3 or 4 ...	3 ...	9 by 6
20 by 16	...	4 or 5 ...	4 ...	9 by 9

Figs 209 and 210 show a view and section of Ellison's air inlets. The principle used is to make cone-shaped holes with the small end situated on the exterior, so as to prevent any draught.

Fig. 214 shows an inlet by Messrs. Doulton. It is of earthenware, and 4 in. in diameter. The top is fixed with a hinged flap, which can be regulated as desired.

7. VENTILATION OUTLETS.

Their Position and Size.—The position of an outlet depends on the inlet. In a general way, it should be removed as far as possible from it. The natural outlet of a room is the fireplace, where there is (or should be) always an up current. The fireplace, however, draws the air out of the bottom of the room, computed at an average velocity of 4 ft. or 5 ft. per second, and we cannot get



Illustrations to Student's Column.

away from this factor in ventilation which is provided for us in every room. This factor induces many authorities to suggest "downward" ventilation, the foul air being drawn out at the bottom of the room. The air currents in a room with an ordinary fireplace are shown in fig. 211. As has been pointed out, in an ordinary room with closed doors and windows the air is drawn along the floor to the fire, part goes up the chimney to help the process of combustion, part, in consequence of its warmth and impetus, flows towards the ceiling. As it cools in traversing the ceiling towards the opposite wall it descends until again warmed. It follows, therefore, that in order to equalise the temperature of the room, the best place to introduce air is in the chimney breast wall above the mantelpiece.

The amount of air that a fire requires is large, and where no heating system is in use quantities of cold air are drawn in to supply this need through cracks of doors and windows, to such an amount that draughts are the result. Although rather trenching on the subject of heating, yet it may be as well to mention here that although cold air may be introduced above the chimney mantel, warmed fresh air can also be introduced there by means of Galton's ventilating grate (fig. 212), in which the air is introduced in a separate flue and passed round a heating surface before entering the room. Such air-tubes, however, require constant cleansing.

Even when air is not introduced to the room it is often advisable to supply fresh air to the fireplace itself in order to aid combustion without drawing cold air from the cracks in doors and windows. The Education Department require an air flue of 72 square in. to each fireplace.

Besides the fireplace opening, outlets may be formed into the smoke flue near the ceiling level. Fig. 213 shows a "mica flap" outlet, which is generally employed in such a situation to prevent a back draught. Thin sheets of mica are hinged on to a frame from the top, and so arranged that the slightest pressure from the flue closes the outlet, and so prevents the entry of smoke into the room. On the other hand, foul air readily escapes. The noise made by the mica flaps, however, is very irritating.

If it is desired, however, to extract air from the top of the room, it is better to have a separate foul air flue, which costs little in a new building. This is warmed by being close to the smoke flue, and consequently has a steady up-current.

Another method is by *ventilating flue pipes*, as shown in fig. 215. These are made by Messrs. Doulton in conjunction with flue pipes (which are used instead of the ordinary "parged and cored" flue). They are made of different sizes and shapes, with either one or two air flues as desired. One outlet is, as a rule, considered more efficient than several. The size of outlets and extracting power of flues have been dealt with.

The Education Department require outlets equal to at least two square inches per child, leading into a separate air chimney carried up in the same stack as the smoke flues.

One maxim to remember is that an outlet must have motive power by heat or exhaust, otherwise it will frequently act as a cold inlet.

Extracting Power of Flues.—Hood arrived at some practical results by experiment as to the extracting power of flues, and we cannot do better than give his table. All that is necessary to make the calculations is to know the temperature of the outer air and that in the vitiated air shaft.

It is to be noted that although the quantity of air extracted depends on the height of the shaft, yet it does not increase directly as to its height, which is due to loss of heat by the ascending air and friction.

TABLE

showing the quantity of air extracted per minute by a ventilating shaft whose area is one square foot; fresh-air inlets being equal in area or a trifle larger:—

Height of ventilating shaft in feet.	Excess of temperature of air entering the ventilating shaft above the external air.					
	5°	10°	15°	20°	25°	30°
10	116	164	200	235	260	284
15	142	202	245	284	318	348
20	164	232	285	330	368	404
25	184	260	318	368	410	450
30	201	284	347	403	450	493
35	218	306	376	436	486	531
40	235	329	403	465	518	570
45	248	348	427	493	551	605
50	260	367	450	518	579	635

As an example, suppose that the height of the shaft is 40 ft., which would be an average height for an ordinary dwelling-house, and the difference in temperature between the outer air and the vitiated air in the shaft be 20 deg., then the discharge would be 465 cubic feet per minute. As the amount of air extracted is greatest in winter, when the difference between the inner and outer air is greatest, the calculation should be made for summer ventilation, and the ventilator may be regulated by mechanical means or by a special form of grating.

8. NATURAL VENTILATION

is that mostly in general use for ordinary buildings, and consists in the removal of foul air and the admittance of fresh by natural means, such as by doors, windows, fireplaces, &c.

In natural ventilation the forces relied upon to supply rooms with fresh air are (1) the wind, which, on the calmest day in England, moves at a velocity of one mile per hour; and (2) the difference in the specific gravity of the inside and outside air.

Nature assists in ventilation, as before explained, because air, when heated, expands and rises, and consequently heated and fouled air given off by the body rises, and can be removed from the apartment by foul-air flues, if fresh air is admitted to take its place. Thus, if cold air is introduced at the lower part of the room and an extract for heated air formed at the top, a natural means of ventilation is provided. Natural ventilation is, however, too much subject to atmospheric conditions to be reliable, and is practically only serviceable in ordinary houses.

9. ARTIFICIAL VENTILATION

includes any system dependent on mechanical means of propulsion and extraction, and may be divided into two systems, viz., the *plenum* and the *vacuum*. In the *plenum* system propulsion is adopted, by which means fresh air is driven into rooms by means of fans or air pumps, and the foul air thus forced to find its way out. This appears to be by far the most satisfactory method. Several examples will be illustrated later on.

The *vacuum* system consists in producing strong up-currents in special extracting shafts by means of either a furnace, gas jets, hot water pipes, or steam coils, steam jets, or by fans, or exhaust pumps worked by steam or electricity. By this means the foul air is drawn out of the room and fresh air is allowed to enter.

From the observations of Carnelly, Haldane, and Anderson, conclusive evidence

has been arrived at proving the superiority of artificial over natural ventilation; as the following table shows. In this case the buildings experimented on were schools :—

—	Natural Ventilation.	Mechanical Ventilation.
Per cent. of windows open	22	3
Cubic feet of air space per head	168	164
Temperature (Fahrenheit)	55·6°	62°
Carbonic acid (per 1,000 volumes)	1·86	1·23
Organic matter (volumes of oxygen required per million volumes of air)...	16·2	10·1
Microbes (per litre)	15·2	16·6

The great difficulty in the application of artificial and mechanical ventilation is the cost and occasionally the liability to get out of order; on the other hand, it possesses the great advantage of constancy under every change of atmosphere, and is, or should be, completely under control as to the supply and source of fresh air, its filtering, purification, temperature and humidity.

All public buildings should be heated by mechanical means.

Of the plenum and vacuum systems, the "plenum" is considered by experts to give the best results, because by employing propulsion the air can be cleansed, tempered, and brought to a proper hygrostatic condition. This can be ascertained by the hygrometer (which is an instrument for measuring the moisture of the atmosphere), and forced in directions most suitable, whereas by the vacuum or extraction method neither of these purifying agencies is available, and the source of the supply is not under the same control. Moreover, it is now generally admitted than employing the "plenum" and "vacuum" in one scheme is a mistake.

In the examples which will be placed before the student both methods are shown.

BOOKS RECEIVED.

WATER SUPPLY AND SEWAGE DISPOSAL IN RURAL DISTRICTS. (Office of *The Lancet*).

HANDBOOK OF SAW MILL AND WOOD CONVERTING MACHINERY. By M. Powis Bale. (William Rider & Son).

FIRE TESTS WITH GLASS.—(No. 20 of Publications of the British Fire Prevention Committee.)

GENERAL BUILDING NEWS.

MISSION CHURCH, LITHERLAND, LANCASHIRE.—The dedication services in connexion with St. Mark's, Litherland, a mission church connected with St. Phillip's, were inaugurated on the 25th ult. The building, which is only temporary, and will in due course be replaced by a permanent church, is a building of iron, erected by Messrs. E. F. Blakeley & Co., under the direction of the architect, Mr. George Bradbury. The church will accommodate 500 persons.

ADDITIONS TO ST. MARY'S CHURCH, SOUTH MILFORD, YORKSHIRE.—The Archbishop of York dedicated on the 24th ult. a new organ chamber and choir vestry at St. Mary's Church, South Milford. The new building, which is on the south side of the chancel, is designed in the late Decorated Gothic style by Messrs. Demaine & Brierley, architects, of York, and it has been built of local wall stones, with Huddlestone stone dressings.

RE-OPENING OF FRASERBURGH FREE CHURCH, ABERDEEN.—The Free Church is now out of the hands of the decorators, and was re-opened on the 23rd ult. The church was erected from designs by Messrs. Pirie & Clyne, architects. Messrs. James Garvie & Sons, Aberdeen, were entrusted with the decorations.

WESLEYAN CHAPEL, EARLSWOOD, SURREY.—The foundation stones of the new Wesleyan Chapel and Sunday School have just been laid at Earlswood. The chapel will be capable of seating 200, and the school-room, with two class-rooms and an end gallery, provides for 300 children. Mr. T. R. Hooper is the architect, and Mr. J. J. Carrick, of Redhill, the builder. The cost will amount to 2,150*l.*

CHURCH, BALLYCOTTON, IRELAND.—The foundation stone has just been laid of the new church at Ballycotton. Mr. G. C. Ashlin, Dublin, is the architect. It is estimated that the building will cost 5,000*l.* Mr. J. J. Coffey, Middleton, has been appointed contractor, with Mr. E. Shinnick as clerk of works, and Mr. E. Quinn, Limerick, foreman. Externally the church will be 98 ft. long and 50 ft. wide. The height of the aisle walls will be 12 ft. from the floor level, and that of the nave walls 25 ft. 6 in., and to the apex of the roof 37 ft. The turret will be 60 ft. high. The structure will be faced with pitch-faced ashlar in random courses, having cut limestone dressings to windows and doors, and similar string courses. The pillars to the nave arcade, which are six in number, will be of Aberdeen granite on Portland stone bases, with moulded Portland stone caps. The roof will be open timbered pitch-pine.

RESTORATION OF NORTH CREAKE CHURCH, NORFOLK.—The church of North Creake has, step by step, been restored and added to. The more recent work has been a new floor of marble to the chancel, a carved oak chancel screen, new panels on the chancel walls, clergy stalls, new lamps, and a carved canopy to the font. The architects were Messrs. Hicks & Charlewood, of Newcastle. The carved work was by Mr. Hedley, Newcastle; the painting by Messrs. Percy Bacon Bros., London; the marble floor by Messrs. Emily & Son, Newcastle; and the panel work by Mr. Himson, Wells-next-the-Sea. The wrought iron lamps were from Thornham.—*Eastern Daily Press.*

CATHOLIC CHURCH, MOUNTAIN ASH, GLAMORGANSHIRE.—A church, dedicated to the Blessed Virgin and "Our Lady of Lourdes," has been erected between the Miskin and the centre of the town, near the new Workmen's Hall and Institute, on the side of the hill overlooking the valley. The church is from the designs of Mr. Bernard Smith, of London, and was built by Messrs. Collins & Godfrey, Tewkesbury, at a cost of 1,000*l.* The building is in Gothic style, and has in the east end a three-light window. The church is composed of a nave 63 ft. long and 28 ft. wide, and a sanctuary 19 ft. long by 17 ft. wide, in addition to which there are a priests' sacristy, acolytes' sacristy, baptistry, vestibule, and organ gallery, the latter being at the west end. The roof of the building is of pitch pine, with battlemented mouldings resting upon corbels. The church is heated with hot air and lit with incandescent gaslight. The Stations of the Cross are placed around the church. The sanctuary is enclosed by a carved oak rail. The altar is built of Pons stones.

CATHOLIC CHURCH, BECCLES.—The foundation-stone of St. Benet's Minster was laid at Beccles recently. The work in hand comprises only a portion of the church, designed in the Norman style by Mr. F. E. Banham, architect, and consists of north façade, nave, baptistry, porch, and confessionals. The church will be built of Ancaster stone with Bath stone dressings, Bath stone being used entirely for the interior. Mr. F. J. Allen's executors are the contractors.

CONGREGATIONAL CHURCH, HARRINGAY.—Plans have been prepared by Mr. W. D. Church for a new Congregational church in Green-lanes, Harringay. The estimated cost of church and schools, with class-rooms, infant-room, church-parlour, organ, and furniture is about 9,500*l.*

RE-OPENING OF BREASTON CHURCH, DERBYSHIRE.—The Bishop of Derby (Dr. Were) re-opened, on the 26th ult., the Church of St. Michael, Breaston, which during the past few months has been considerably altered and restored. The designs were prepared by Messrs. R. Evans & Son, of Nottingham. A stone organ chamber and vestry have been built in place of the brick vestry, and an oak screen, in harmony with the other fittings of the church, has been erected in the chancel, which has also been tiled. The walls have been re-plastered, and the whole of the roof has been stripped off, and the woodwork repaired, whilst a new oak roof has been provided for the south aisle. New choir stalls have been built in the chancel, but these are only of a temporary nature. Mr. Charles Baines, of Newark, for whom Mr. Askew Browning has acted as superintendent, was the contractor for the work.

WESLEYAN CHURCH, FAIRHAVEN, BLACKPOOL.—The corner stones of a new Wesleyan Mission Church were laid recently at St. Annes. The new building is part of a scheme of development which the Lytham and St. Annes Wesleyan Methodist Circuit have taken in hand. It is ultimately intended to erect on the site a complete church, schools, and manse, at a cost of 7,000*l.* For the present, however, it is only intended to erect a mission church, at a cost of about 900*l.* The new building, which is from designs by Mr. Frank Chappell, of Lytham, is being erected by Messrs. Dixon & Co., Liverpool. Seating accommodation will be provided in the church for 225, and in the school for 125; and three vestries will be included.

DUNDEE PARISH COUNCIL NEW OFFICES.—The Offices Committee of Dundee Parish Council met on the 21st ult., and considered sketch-plans of the new premises proposed to be erected in West Bell-street. The plans were approved of, and Mr. Alexander, the architect, was instructed to prepare front elevation and finished plans for submission to the Council.

VICTORIA HOSPITAL, RICHMOND, YORKSHIRE.—The Richmond and District Victoria Hospital, erected as a memorial of the Queen's Diamond Jubilee, was opened recently. The site, which was given by the Marquis of Zetland, is at the top of the Queen's-road. The building is one story high, and comprises two wards, each having three beds, for males and females respectively. There is also a special ward with a single bed. In the "Rose Cottage" portion of the premises there are two rooms for special cases, and a bedroom and sitting-room for the nurse. The architects for the building were Messrs. Clark & Moscrop, of Darlington.

BUILDING IN ABERDEEN.—Aberdeen continues to extend rapidly, and at present most branches of the building trade are extremely busy. Two new churches are being put up in the Stocket district, and three new public schools are being built in different parts of the city. Among buildings almost finished are the following:—Large warehouse in Bridge-street, Messrs. Harper & Sutherland, architects, Aberdeen; spirit merchant's warehouse, Regent-quay, and reconstruction of Queen's Restaurant, Union-street, Mr. A. M. Mackenzie, A.R.S.A., architect, Aberdeen; ice factory, Poynernook-road, granite works at Ashgrove-road and Balmoral-road, and extension of City Hospital, Mr. John Rust, architect. Among buildings just begun are:—hotel, Guild-street; boot factory, Leadside-road; museum, &c., at new Botanical Garden; and various villas at Rubislaw Den. Messrs. Pringle & Slessor, masons, have commenced the reconstruction of a large warehouse at Bridge-place and Windmill-brae, which was destroyed by fire on April 22. Mr. John Rust, Aberdeen, is architect for the work, which will cost about 9,000*l.* Contracts have been entered into for construction of a district hospital at Stocket, just beyond the city boundary, Mr. J. D. Watson, County Engineer, being architect, and the estimated total cost being 3,619*l.* 7*s.* 9*d.* A new cemetery is intended to be laid out at Craigieshaw, from designs by Messrs. Walker & Duncan, C.E., Aberdeen; and it is also proposed to enlarge Trinity Cemetery. Mr. W. Kelly, architect, reports that the cost of reconstructing and enlarging the East Poorhouse would be 30,000*l.*, while the expense of building a new poorhouse for all the indoor ordinary paupers in the city would be 54,900*l.*, including cost of ground.

GLASS-ROOFED SHIPBUILDING YARDS, WALLSEND.—Mr. Sam Deards, of Harlow, has just completed a large glazing contract at Messrs. Swan & Hunter's shipbuilding yards, at Wallsend, Newcastle-on-Tyne. The firm has erected two lofty buildings, large enough to enable them to build the largest kinds of merchant vessels afloat under cover, the dimensions of each being 500 ft. long by 75 ft. wide, 80 ft. high to the eaves, and 120 ft. high to the apex of the roofs, and these two buildings have been entirely covered with glass of ¼ in. thickness, weighing with the patent steel bars over 300 tons. The system of glazing is this: A specially prepared bar in T steel is made, having a centre web with turned up sides, so as to form a groove or gutter on either side to carry the squares of glass, and over the centre web is fixed a lead capping, which is held down by pins of copper every 9 in. or 10 in. and these, acting as springs, give and take to every change of temperature and every need of expansion and contraction. The glass is so arranged and fixed that every square can be taken out and replaced from the inside.

TOWER BUILDINGS, MORECAMBE.—Two of the contracts in connexion with the new tower buildings at Morecambe have been let, and the erection of shops, restaurants, smoke-rooms, entrance to pavilion, &c., facing the bay, is now in progress. The buildings occupy the site of what was once Calton Lodge Estate, have a frontage to the bay of 315 ft., and the gardens, with tower, terraces, alcoves, conservatories, and refreshment-rooms, cover the remainder of the grounds. The tower itself, which forms the chief feature of the buildings, will have a total height of 238 ft. The engineer for the tower is Mr. R. J. Gifford-Read, of Westminster, and the architects for the whole are Messrs. W. H. and A. Sugden, Keighley. Contracts Nos. 1 and 2 have been let to Mr. John Edmondson, of Morecambe. The clerk of works is Mr. George Paterson, of Patricroft. The contract for the tower will be let early this month, and it is anticipated that all will be completed and ready for opening towards the summer of 1900.

ART GALLERY AND LIBRARY, BURY, LANCASHIRE.—The new art gallery and library, at Bury, designed by Messrs. Woodhouse & Willoughby, Manchester, has just been opened. When completed, the structure will comprise three stories, consisting of basement floor, ground, and first floors, with a sub-basement under the portion at the rear. The building comprises two separate sections, viz., the Art Gallery (placed on the first floor) and the public library, &c. (on the ground floor). The first floor is to be entirely devoted to the Art Gallery, and will be entered by the main staircase through the sculpture hall, from Moss-lane, and is arranged in a sequence of five rooms. The contractors for the erection of the building are Messrs. Thompson & Brierley, of Bury.

WORKING MEN'S HOMES, BURTON-ON-TRENT.—At a meeting of the directors of the Burton-on-Trent Artisans' Dwellings Company on Monday, tenders were accepted for the construction of the first block of forty houses to be erected on the land the company have taken from the Marquis of Anglesey, between Horninglow-road and Wyggeston-street. The land will provide accommodation for 150 cottages. Mr. T. Jenkins, of Burton-on-Trent, is the architect.

BANK, DUBLIN.—A building in Upper Dorset-street, Dublin, will shortly be opened for business by the Hibernian Bank. It has been in course of construction for several months, the site being at the corner of what was formerly known as White's-

lane, and the new premises have been erected by Mr. Kevin Toole from plans prepared by Mr. W. H. Byrne, C.E.

THEATRE, RICHMOND, SURREY.—A theatre is being erected on Richmond Green. The main entrance will be approached by a flight of five steps leading into a vestibule, with a ticket office on the right. The entrance to the stalls will be along a corridor, while the boxes and dress circle will be reached by a marble staircase. At the back of the dress circle tier there are to be two private boxes, the tiers being carried on cantilevers. The stage, which will be 30 ft. deep by 51 ft. wide, with an opening of 27 ft., will be separated from the auditorium by a fire-proof curtain. The manager's room will be situated on the left of the stage. Electric light will be provided throughout. The architect is Mr. Frank Matcham.

MISSION HALL, KENDAL.—The foundation stone has just been laid of a mission hall at the junction of Syke with Lower Fellside. Mr. J. Thompson, of Kendal, is the architect.

ROMAN CATHOLIC ORATORY, CHATHILL, NORTHUMBERLAND.—On the 27th ult., at Ellingham Hall, Chathill, Northumberland, the seat of Sir John de Marie Haggerston, a new Roman Catholic oratory was opened. The oratory has been built from a design by Messrs. Dunn & Hansom, architects, Newcastle.

BATHS, LEEDS.—The fifth public bathing establishment erected by the Leeds Corporation was opened recently. It is situated in Meanwood-road, on a portion of the old West Riding Athletic Ground, and has cost the city 13,000*l.*, this sum being inclusive of 3,000*l.* paid for the site. The features of the building are very similar to those of the other Corporation Baths that have been provided during the past four years. As the latest institution of its kind, however, it possesses one or two improvements upon the older establishments, and is, besides, more commodious. There are first and second-class swimming baths of considerable dimensions, also ten slipper baths for each class, five of those on the first-class side being for ladies. The special advantage possessed over the other places is the greater space at disposal. This has enabled each section to be extended. The boiler-house, too, being practically on the same level, and lighted from above, is in a better situation. Oak has been adopted instead of a softer wood; and in the first-class slipper baths the furniture is of American walnut instead of pitch pine. Amongst other improvements are—the transfer of the vapour baths from the second to the first-class side, thus equalising the work of the attendants, and leaving the whole of the ten slippers available for slippers only; the placing of the supply pipes beneath the floor of the bath-rooms (they are brought up separate to each bath); the waiting-rooms (only provided at Holbeck and Meanwood-road) are placed at the entrances to the various rooms, instead of being, as at Holbeck, beyond those entrances, therefore out of the way; the soap-baths have been reduced in size to give room for a shower-bath (this alteration is to be made at all the other places); the end gallery is also introduced at Meanwood-road, as at Holbeck and Hunslet. The waste pipes of slippers have been trapped. Messrs. W. Hanstock & Son, of Leeds, were the architects.

STAINED GLASS AND DECORATION.

MEMORIAL WINDOW, COUNTY HOSPITAL CHAPEL, DORCHESTER.—A memorial east window has just been dedicated in this chapel. It has been carried out by Messrs. Lavers & Westlake, of London.

MEMORIAL WINDOWS, ST. CATHERINE'S CHURCH, HORSE FAIR, BIRMINGHAM.—Seven stained-glass windows have just been erected in the apse of this church. The subjects are scenes from the Apocalypse. The work has been executed by Messrs. John Hardman & Co., under the direction of Mr. Dunstan J. Powell.

FOREIGN.

FRANCE.—The engineer for the Paris Metropolitan Railway has addressed to the Municipal Council a report, showing that the work is now in progress throughout the whole length of the proposed course. The end sections, at the Champs Elysées and the Avenue de la Grande Armée especially, are the most forward; but the general rate of progress is such that there is hope of completing the railway for the Exhibition year.——The late Charles Yriarte has left to the libraries of the Institut and of the Ecole des Beaux-Arts an interesting collection of original documents relating to the Venetian artists of the fourteenth, fifteenth, and sixteenth centuries, also several copies made by him in the archives of the principal towns of Italy.——The remains of the Bastille tower, recently discovered in the works of the Metropolitan Railway, are to be placed on the Quai Celestins, at the intersection of the Pont Sully and the Pont du Quai Henry IV.——The magnificent tapestries in the Church of Saint Rémi, at Reims, are now being repaired at the Gobelins manufactory.——M. Pascal, architect, is now engaged in carrying out the works of the Bibliothèque Nationale, for which Parliament has voted the sum of 1,200,000 francs. The façades on the Rue Colbert and the Rue Vivienne, which are to be completed in two years, will have the simple and severe architectural character of the façade which flanks the Rue Richelieu.——The Conservatoire des Arts et Métiers has just started a competition for the execution of a candelabra for electric lights, to replace the ugly one which now lights the Place du Carrousel, which is shortly to be converted into a garden.——M. Esparbès, architect to the town of Luchon, has been commissioned by the Municipality to rebuild the well-known bathing establishment in that locality.——The works for the railway from Dieppe to Havre are being actively carried on and it is expected they will be completed by the middle of next year.——The death of M. Louis Frederic Benoit is announced, at the age of sixty-eight. He studied architecture at the Ecole des Beaux-Arts at Lyons under the direction of Chenavard, and he gained the first prize in 1852. Besides many private works, we may mention the building of the churches of Leguy, and of the Rédemption at Brottiaux, and the restoration of the church of St. Nizier. He had been a member of the Société Centrale des Architects since 1871.

DURBAN.—Durban Corporation are at present laying out the new esplanade, which will be about two miles in length, and cost 100,000*l.* Massive railings are being erected the entire length, and a band-stand will also be included in the scheme. The site of this will be opposite the new Marine Hotel. The hotel commands an excellent view of the bay. The first section of the building involves an expenditure of 10,000*l.*, and the whole scheme a cost of 25,000*l.* Work in connexion with the first section is now proceeding, and will be finished, it is expected, early in May. The buildings will have a frontage of 230 ft. to Gardiner-street, and of 105 ft. to the Bay Embankment. Mr. W. E. Robarts is the architect, and Mr. W. F. Johnstone the contractor.—*South Africa.*

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—The partnership hitherto existing between Mr. J. S. Gibson and Mr. L. B. Russell, architects, 4, Gray's Inn-square, has been dissolved. Mr. Gibson will continue to practise at No. 4, and Mr. Russell at No. 11, Gray's Inn-square, W.C.——Mr. Walter Lawrence, builder, Waltham Abbey, has taken his son into partnership, and the business, as from May 1, will be carried on under the name of Walter Lawrence & Son.

BRADFORD MASTER BUILDERS' ASSOCIATION.—At a meeting of the Bradford Master Builders' Association, held on the 25th ult. in the Stone Exchange, a presentation was made to Mr. John Schofield, who, owing to failing health, recently retired from the position of secretary, which he had held for eighteen years. Alderman William Holdsworth, President of the National Master Builders' Association, occupied the chair. The presentation consisted of a silver tea service, with tray, bearing a suitable inscription, and the gift was accompanied by a framed illuminated address testifying to the Association's appreciation of Mr. Schofield's valuable services, and expressing the high esteem and best wishes of the members for himself. Alderman Holdsworth made the presentation. Mr. Schofield warmly thanked the members for their gift, and for their uniform kindness during a long connexion with the Association, which had had such a pleasant termination. Since he was appointed secretary in January, 1881, the Association had maintained the interests of the building trade in all its varied phases. There had been encounters with the operatives' organisations; these had been sometimes of an antagonistic character, and sometimes a settlement had been reached by friendly consultation. It was pleasant to know that wages in all branches of the trade had been advanced, and that various alterations had been effected beneficial to the operatives. To himself personally it was always pleasant to find that the Association favoured the policy of sanctioning the payment of fair wages, and in other ways helping the operatives to better conditions.

IMPROVEMENTS AT VICTORIA.—A Committee of the House of Commons of which Mr. Hoare is Chairman, has been sitting recently to consider the Various Powers Bill of the London, Brighton, and South Coast Railway. The Bill, among other things, empowers the company to construct two short lines of railway, the one at Deptford and the other between Holmwood and Crawley, to carry out various widenings of their present line, to raise fresh capital, and to reconstruct their station at Victoria by widening it from the southern side of the Grosvenor Hotel along the Buckingham Palace-road. The Chairman on Monday said that, with reference to the Duke of Westminster's petition, the Committee would hear counsel on the clauses, and the point would be reserved until then. With regard to the Grosvenor Hotel, provided the amended plans with regard to the interference with the wells were adhered to, the Committee would not further alter the clauses in the bill. Subject to these reservations, the preamble of the bill, so far as it had reference to Victoria, was found to be proved.

HOLBORN TO THE STRAND.—The Select Committee, presided over by Mr. A. H. Brown, which has been sitting for the consideration of the scheme of the London County Council for the construction of a new thoroughfare from the Strand to Holborn, resumed the investigation on the 27th ult. Alderman Samuel Green, Fellow of the Surveyors' Institution, said he now acted as one of the surveyors to the Board of Trade. He believed the Strand would be improved very materially. He knew of no situation in London where improvement could be so fairly recognised to-day as on the south side of the Strand.—Mr. Ram, for the Strand District Board of Works, next proceeded with his case. Mr. Arthur Ventris, Engineer and Surveyor to the Board, stated that the effect of the Bill in the first year would be to raise the rates in the district of St. Mary-le-Strand from 6s. 1d. to 9s. 3d. After the first year the revaluation would be made, and the new rate would be spread over the whole of the Strand, which would reduce the rate to 6s. 7d., or 6d. above the present amount. His Board thought that, as they were to be responsible for the maintenance of part of the street, they should have a voice in its construction. Their demand in this respect was based on the experience of the Strand district in connexion with wood paving. Sir Alexander Binnie had said that the life of a soft wood pavement was seven years, but owing to the way the Strand Board did the work they found that such a pavement could be made to last much longer.—Mr. R. Vigers, President of the Surveyors' Institution, said it was only reasonable that the County Council should make good the loss to the rates of the several parishes through the construction of works until the new property was rated.—On Tuesday it was announced that the committee had decided to pass the preamble of the Bill, subject to the following conditions:—That the preamble is proved so far as regards the Strand and Holborn improvements; that the land south of the Strand be excluded from the betterment area, also the property of the *Financial Times*; that the number of years in which betterment may be proved be limited to ten, namely, seven for works and three for improvement; that the Dane's Inn property remain as proposed in the Bill; that the making of the road remain in the hands of the County Council; that it is not proposed to reinsert in this Bill Section 133 of the Lands Clauses Act, but that the Sardinia-street works of the Metropolitan Electric Supply Company be reinstated in such a way that there be no interference with the business, and on such a site as will protect them from any proceeding for making a nuisance. With regard to clause 20, the committee think some Government authority should give a certificate of approval before property is taken under the valuation provided under Section 21 of the Housing of the Working Classes Act, 1890.

ART UNION OF LONDON.—The annual general meeting of members of the Art Union of London was held on the 27th ult. in the lecture hall of the Society of Arts, John-street, Adelphi, the Marquis of Lothian, the President, being in the chair. The report stated that the subscription for the year had enabled the Council, after setting aside 1,246*l.* for works of art presented to subscribers, to appropriate 506*l.* 5s. for the purchase of prizes to be drawn for that day, making, with those awarded to unsuccessful members of ten consecutive years' standing, a total of 170 prizes. The Chairman, in moving the adoption of the report, said the Society had, since its foundation, expended 487,000*l.* in prizes and works of art. He thought it was not too much to say that if it had not been for the Society the beautiful art of line engraving would have disappeared altogether. It was now trying to encourage etching, especially of landscape, in which direction the public taste now seemed to lie. He was glad that the question of hideous additions to London was being taken up. He thought that an expert committee ought to have control over the proposals for new public works in London. He was glad that public interest was being aroused on the subject of the decoration of St. Paul's Cathedral. It was said that the mosaics were of a Byzantine character, and were, therefore, not suitable. With that he entirely disagreed. If the small domes were to be filled with mosaics he could conceive of no better way of doing it than the way in which it was done now. As to the decoration of the stonework, he thought it must be obvious to every one that if the small domes had been filled with mosaics and the stonework around left untouched, the work would have appeared very patchy and anything but effective. But there was a medium in all things, and he could not help thinking that too much colouring had been made use of in the decoration of the stonework. He trusted that in the future there would be less gilding and less colouring used.—Mr. Sebastian seconded the motion, and the report was adopted. The Dean of St. Paul's was elected a Vice-President and the members of the Council for the ensuing year were also elected. The drawing for prizes of works of art for the year 1898-99 subsequently took place.

ARTISTIC COPYRIGHT.—In the House of Commons, on the 28th ult., Lord Monkswell, in moving the second reading of the Copyright (Artistic) Bill, said under it American artists would be given the same rights in their works in this country as English artists enjoyed in America. The Bill would give copyright in an original work of art during the artist's life and for thirty years thereafter. The Bill was read a second time and referred to a Select Committee.

COMMONS PRESERVATION SOCIETY.—A meeting of the Executive Committee of the Commons Preservation Society was held at 1, Great College-street, Westminster, on Wednesday, the 20th ult. The Right Hon. G. J. Shaw-Lefevre presided. Deputations from the Bradford Corporation and from the Shipley Urban District Council waited upon the Society with respect to the provisions in the Bradford Corporation Tramways and Improvement Bill, opposed by the Society on the ground of the proposed enclosure of 100 acres of Baildon Moor. Of this area it was intended to convey 50 acres to the lord of the manor in part satisfaction of his manorial rights over the moor, the other 50 acres to be sold by the Corporation to recoup themselves for the purchase and improvement of the remainder of the moor. In consequence of the Society's opposition the Corporation waived the provision entitling them to sell 50 acres, but declined to strike out the clause authorising the allotment to the lord of the manor. After hearing at length the arguments brought forward by the representatives of the Bradford Corporation in favour of the Bill, and of the Shipley Urban District Council against it, the Society, while recognising the desire of the Corporation to preserve the moor, decided to continue its opposition. It was felt that the compensation to be given to the lord of the manor was excessive, and that no reasons had been given to justify the departure from the principle always acted upon by the Society that no enclosure of suburban common lands, as defined by the Commons Act of 1876, should be allowed to be carried out without opposition. It was agreed to secure the moving of the following Instruction in the House of Commons, "That it be an Instruction to the Committee to whom this Bill is referred to omit all provisions from the Bill authorising the enclosure of any part of Baildon Moor." Amongst other Bills considered were the East London Water Bill, the L. B. & S. C. R. (Various Powers) Bill and the Highland Water Power Bill. Communications were read alleging that the works for providing water power and electrical generating stations contemplated under the last-named Bill would seriously disfigure the natural beauty of Lochs Leven and Ericht. The matter was referred to the Parliamentary Amenities Committee. A Bill will shortly be introduced into Parliament at the instance of the Society for the purpose of simplifying the machinery for the regulation of commons under the Commons Acts, and for the better protection of common land.

NATIONAL REGISTRATION OF PLUMBERS.—The annual meeting of the District Council for Glasgow and West of Scotland was held on Tuesday at Glasgow. The Vice-President of the Council, Mr. John Gordon, architect, was in the chair. The annual report gave full details of the educational work carried on by the Council in theoretical and practical plumbing classes in Glasgow and Ayr, and dealt with other matters connected with the registration movement. After the adoption of the report and elections to fill vacancies on the District Council, Sir John Neilson Cuthbertson presented the bronze medal of the Worshipful Company of Plumbers and the various prizes and certificates gained by journeymen and apprentices in the Glasgow and West of Scotland District in connexion with the exhibition held in Glasgow last year, afterwards delivering an address to the prize-takers and the younger members of the trade.—Sir Jas Russell, M.D., presided over the annual meeting of the East of Scotland District Council, held in Edinburgh last week. The Chairman, in moving the adoption of the report, said that they had now recognised for some years that to render the movement effective, and to secure for the public the benefit it was calculated to give them, registration was necessary. It was not intended to compel any one to come into the movement, but it was felt to be absolutely necessary that those who came under a guarantee of competency and discipline should have their status marked out by Parliamentary imprimatur.

UNITED BUILDERS' LABOURERS' UNION. — The annual report states that the work of the Union has been largely augmented by the introduction of the Workmen's Compensation Act, which they have found a measure "fruitful of litigation." They however congratulate themselves that they have been enabled to avoid litigation to a great extent as compared with other trades. They have felt that the best interests of the injured workman is secured by a mutual discussion of his case, which usually ends in more satisfactory compensation being secured to the injured in preference to the cumbersome and expensive legal methods of settlement. They have settled by this means sixty-five cases during the year, and secured a sum of 768*l.* 6s. 2d., which is an average of over one case settled a week.

LAND AND HOUSE PURCHASE PROVIDENT SOCIETY.—The report of this society states that it is making steady progress in the acquisition of properties for its members, though "still greatly hampered for want of capital." The committee state, however, that they consider that "a very good nucleus for the formation of a powerful and useful institution has been established, and are confident that there is an enormous future before the society for the providing of well-built sanitary workmen's cottages, the tenant members acquiring their homes out of moneys they would otherwise pay away as rent, such homes, when free, to the thrifty and provident, becoming equivalent to an old age pension."

THE NEW GOVERNMENT BUILDINGS. — In the House of Commons on Tuesday, Mr. Allhusen asked the First Commissioner of Works whether the designs by Mr. Young and Mr. Brydon for the new Government buildings had been definitely approved by the committee; and, if not, whether he would procure and place in the tea-room of the House a sketch of a design for the new War Office buildings, which had been adapted at the suggestion of Lord Wemyss from the existing designs by Inigo Jones for a Royal palace in Whitehall. Mr. Akers-Douglas: The designs of Mr. Young and Mr. Brydon were approved by her Majesty's Government before they were submitted to the House. I have carefully considered the sketch elevation prepared at the suggestion of Lord Wemyss, and I regret that, although externally attractive, as a design for a Royal palace it is unsuitable for Government offices. There would be no useful purpose served in placing this design in the tea-room, unless it is accompanied by a plan and sections showing the nature and arrangement of the accommodation it would provide. In answer to Mr. John Ellis, Mr. Akers-Douglas said the plans were placed in the tea-room for the inspection and criticism of hon. members. Certain alterations in matters of detail have been suggested, and these suggestions will be carefully considered. Generally, the plans have been most favourably received, and I shall proceed with the work without any unnecessary delay.

ST. GEORGE'S CHURCH, LIVERPOOL.—We hear that the Liverpool Corporation have agreed to accept the site "with or without the tower," so that it is to be hoped this means that the tower will be preserved.

CAPITAL AND LABOUR.

BARNSLEY BUILDING TRADES.—The disputes on wages questions in the Barnsley building trades have been under consideration, and the joiners have come to terms with their employers and work will go on as usual. The difficulties with the masons and bricklayers have not yet been settled. The masons' employers demand alterations of working conditions in the matter of apprentices, and to allow stone dressed elsewhere than on the works to be used as it is in other towns; and the bricklayers' employers demand changes in the apprentices' regulations. In each case a strike is threatened.

THE WAGES OF SHEFFIELD CARPENTERS AND JOINERS.—A conference was recently held between representatives of the Master Builders' Association of Sheffield and the representatives of the organised carpenters and joiners, to consider the workmen's request for an advance of one halfpenny per hour on their present rate of wages, and an alteration of several working rules. The result of the conference was that, pending the settlement of rules, the advance asked for was granted.

THE BRICKLAYERS' STRIKE AT FELIXSTOWE.—The strike of bricklayers at Felixstowe has been amicably settled. The strike, it may be remembered, originated in the refusal of the masters to concede 8d. per hour immediately, being an advance upon 7d. The masters offered 7½d. immediately, 7¾d. in September, and 8d. in January. The men have accepted 7½d. to commence on the 1st inst., and 8d. on September 1. A question was asked by the men if the masters would reinstate the strikers. The masters replied that they would be only too pleased to do so as matters progressed, but the work was at present too disorganised to make a general reinstatement.

NORTHERN COUNTIES FEDERATION.—A meeting of the Newcastle Master Builders' Association was held on the 28th ult., to receive the result of the ballot taken in the district of the Northern Counties Federation—(1) As to whether there should be a general lock-out of all branches of the building trade in the Federation, unless the plasterers' dispute is forthwith settled; and (2) whether there should be a general lock-out of labourers in the Northern Counties in the employment of members of the Federation in case the disputes at Sunderland, Middlesbrough, and Gateshead are not settled. These disputes, arise out of demands by the men that wages shall be advanced to a standard of 7d. per hour, instead of 6d. to 6½d. as at present. The men have been out at Gateshead and Sunderland, and a lock-out of other branches has been threatened by the employers. The ballot, it was reported to the meeting, was in favour of both propositions submitted, but in view of the resolution passed at Birmingham the previous day by the National Association it was decided to suspend local action for a week, and see what course the National Association would take.

STRIKE OF L.C.C. PAVIORS.—On the 1st inst. a strike took place among the paviors employed by the London County Council upon the tramway in Kennington Park-road. The men—about a dozen in number—threw down their tools at breakfast time and left work to enforce their demand for more wages. Under the old system, when the repairs were let out to contractors by the tramway company, the paviors were paid 10d. an hour on piecework, but the County Council standard for the same work is only 9d. an hour. A protest is made against this rate of payment, and the men declare they will not return to work until the old wages have been restored. They allege that the trade-union rate of wages is 10d. per hour. Another grievance of the men is that three days' pay is retained by their present employers, which comes hard on those just starting after having been out of work any time. But it is explained that the wage sheets are now always made up to Wednesday night, so the rules only affect the new hands. With 2,000 workmen of this class, a strict adherence to the regulations is, of course, necessary.—*Daily Chronicle.*

HULL BUILDING TRADES DISPUTE.—At a meeting of the Yorkshire Executive of the Building Trades Employers' Federation, held in Leeds on the 28th ult., the President (Mr. Spink, Sheffield) in the chair, the following resolution was passed: "That in consequence of the action of Hull operatives, who have struck, and refused to work along with non-union men, this Federation instructs the Hull Affiliated Association to lock out 25 per cent. of their union men to-day (Saturday), and, failing a settlement of the dispute by May 5, the Yorkshire Federation call upon the federated masters in Yorkshire to lock-out 25 per cent. of the union men in their employ on May 6."

NEWPORT (MON.) CARPENTERS LOCKED OUT.—The whole of the carpenters of Newport, numbering about 150, were on the 29th ult. given two hours' notice by their employers that they were to discontinue their services. This is the upshot, it is stated, of a number of the carpenters taking sides in the plasterers' dispute.

BUILDING TRADE DISPUTE AT CARDIFF.—A large number of the members of the Operative Society of Stonemasons struck work on Monday. The strike is owing to the members of the Cardiff Master Builders' Association refusing to amend the working rules and to grant a ½d. an hour advance in wages.

BUILDING TRADE DISPUTE AT WOLVERHAMPTON.—The six months' notice given to the Wolverhampton master builders by the labourers for an advance from 5½d. to 6d. per hour in the rate of wages paid in Wolverhampton and district expired on Saturday last. On the previous evening a deputation from the labourers' society met a sub-committee of the masters' association, but the negotiations proved abortive.

ADVANCE OF WAGES TO JOINERS, MANCHESTER AND LIVERPOOL.—The threatened dispute in the Manchester and Liverpool joinery trades has been settled by the employers in Manchester district conceding an advance from 9d. to 9½d. per hour. When the demand was made the masters offered a farthing, and a farthing in October, and the Liverpool employers gave notice of a reduction of a farthing.

STRIKE OF MASONS AT BARNSLEY.—The negotiations which have been going on for some time past in connexion with the building trades of Barnsley have not been sufficient to prevent a rupture. The masons of the town came out on Saturday. Three months ago the joiners, masons, and bricklayers, acting simultaneously, gave notice for an advance of ½d. per hour in wages, to make the pay of joiners and masons 8½d. per hour, and bricklayers 9d. per hour. The employers at the same time gave notice in each case for an alteration in the working rules. The joiners, as already reported, came to an agreement with their employers recently, and are prepared to work on. The masons and the bricklayers did not settle, but the chief dispute is, it seems, with the masons. The employers gave notice of an alteration of the rule relating to the use of sawn and dressed stone. At the present moment, and for years past, in other towns it has been the custom to allow machine-sawn and dressed stone to be used, but the Barnsley masons have opposed that, and have had a rule that sawn stone should not be used in any building, except for window sills and one or two other minor details; but that all stone should be hand-dressed on the place where the building was actually in progress. Notice to make an alteration in the apprenticeship rule was also given. Several meetings have taken place. The masters had no objection to grant the advance of wages if the alterations in working rules were allowed, and especially if the restriction of the amount of work done, which has greatly increased the cost of building in recent years, was removed. The men declined to allow any alteration whatever. The rule as to sawn stone, which is really an attempt to fight against the introduction of machinery to the building trades, was especially objectionable. This rule in the past has been the subject of many strikes. The contractors have long wished for an alteration of the rule. Now, acting in conjunction with the Building Trades Federation as they do, it has been decided that this special local restriction must be given up, and as the men express themselves as determined to stick to the rule and to maintain it, the struggle may be a long one. So far as the bricklayers are concerned, the question of apprentices seems to be the chief difficulty. The labourers are in the same position as the masons, refusing alterations of rule and other matters. But however other branches of the trade may settle, or otherwise, they cannot go on working long if the masons' strike continues.—*Sheffield Telegraph.*

BUILDING DISPUTE, SWANSEA.—There are little signs of a settlement of the dispute between the master builders and the joiners and plasterers at Swansea. The six months' notice expired on the

29th ult., and meetings were held that evening to endeavour to avert a strike. Nothing conclusive was arrived at. After the meetings of men and masters on Saturday evening the masters received deputations from both the joiners and plasterers. With regard to the joiners an informal suggestion was made by one of the men's representatives that the matter should be submitted to arbitration. This suggestion was received in an encouraging manner by the masters, of whom there was a sufficient representation present to make consent assured. The men, however, had to consult before agreeing. A suggestion was made by one of the masters that the men should go in on the 1st inst. for another month pending the decision of the matter by arbitration, but there is no reason to believe but that this course will be adopted. The plasterers were afterwards received, but no arrangement could be effected, and it is pretty clear that this section will stop work.—*Western Mail.*

BUILDING TRADE DISPUTE, WAKEFIELD.—About eighty journeymen carpenters and joiners at Wakefield struck work on the 1st inst. The men assert that last November they gave their employers six months' notice for an advance of their wages from 7½d. to 8d. per hour, and they also asked for a signed code of working rules. They have now determined not to return to work until the masters sign rules agreed to a fortnight ago.

THE BUILDING TRADE DISPUTE, SUNDERLAND.—The strike of builders' labourers at Sunderland was practically settled at a conference between the employers and the men on the 1st inst. The men's committee recommended them to resume work at the old rate of wages, and asked the masters to withdraw their recent demand for a reduction of ½d. per hour.

STRIKE OF MASONS, ROTHERHAM.—A dispute has occurred in the Rotherham building trade. Three months ago the members of the Rotherham Lodge of the Friendly Society of Operative Masons gave formal notice of their intention to demand fresh terms from their employers. They asked :—(1) That the wages be advanced 1d. per hour—to 10d. for "bankers"; and 1½d. per hour—to 10½d. for "fixers," all the year round; (2) that the winter rules be—during November, to start at 7 and cease at 5; December, 7.30 to 4.30; first two weeks in January same time, remainder 7.30 to 5; first two weeks in February, 7 to 5, last fortnight full time. The new conditions were sought to be brought into force on the 1st inst. On Friday last week the Master Builders' Association met a deputation of the men, and discussed the primary question, viz., that of an advance of wages. The employers asked that the notices should remain in abeyance until the notices handed in by the Sheffield masons expired in June next, the feeling being that both towns should act alike in regard to terms. The answer of the deputation was to the effect that they had no power to comply with the request. On Saturday all the masons recived their back pay with their wages, and on the 1st inst. they were out on strike.—*Sheffield Telegraph.*

BUILDING TRADE DISPUTE, GOSPORT.—Three hundred labourers, chiefly connected with the building trade, struck work at Gosport on Monday for an advance of wages from 5d. to 6d. per hour. The works principally affected are those in connexion with the fortification contracts, which are held by local builders.

STRIKE OF CARPENTERS AND JOINERS, BELFAST.—The dispute which has arisen in the local building trade between the Belfast Builders' Association and the Amalgamated Society of Carpenters and Joiners reached an acute stage on Monday, when a large number of men came out on strike. On January 31 last the Builders' Association submitted to the men a number of rules regarding the trade, to come into operation on and after May 1. The men declined to accept the proposed rules, holding out to the rules which had previously been in force, and as a protest against the alterations, which involved a reduction in wages of a penny per hour, ceased work on Saturday afternoon, when the notices expired. The total number of men out on Monday was between 200 and 250, and the dispute affects ten firms in the city. Three or four firms have given in.

PLASTERERS AND BRICKLAYERS, NORTH WALSHAM.—The plasterers and bricklayers of the North Walsham branch society went out on strike on the 1st inst. on the refusal of the masters to sign the society rules and raise wages from 5½d. to 6½d. per hour.

GRIMSBY BRICKLAYERS AND THEIR WAGES.—In accordance with the decision arrived at some time ago, a small deputation from the Grimsby branch of the Bricklayers' Society has waited upon most of the master builders at Grimsby respecting the men's demand for increased wages. With but one or two exceptions the masters received the deputation favourably, and expressed their willingness to arrange matters amicably. It is, therefore, expected that terms will be arrived at without any trouble.—*Eastern Morning News.*

STONEMASONS' WAGES, WHITBY.—A meeting of the Whitby branch of the Operative Society of Masons was held at the Whitby Arms Hotel on the 1st inst. to hear the report presented by the delegates. Mr. R. Bulmer occupied the chair.—The Chairman, during the course of his remarks, dwelt upon the courteous manner in which the demands of the Society had been met by employers in the entire town and district. They had, he said, been under three months' notice from employers, which notice expired on May 1, but after only partial suspension of work the employers had conceded an increase of three-farthings, which would raise the pay from 7¾d. to 8½d. per hour, the week to comprise 49½ hours. The hour system of work was also to be commenced, and the old "day" system discarded.

LEGAL.

DISPUTE AS TO STRUCTURAL ALTERATIONS IN A PUBLIC-HOUSE.

THE case of Peter *v.* The Plymouth Breweries, Limited, again came before Mr. Justice North in the Chancery Division on the 28th ult. (the case was reported in the *Builder* of last week), on a motion by Mr. A. E. Peter for an injunction until the trial restraining the defendants from altering or interfering with the structure of the "Exmouth" public-house, at the corner of Union and Manor streets, Stonehouse, so as to prevent or prejudice the carrying on upon the premises of a licensed victualler in alleged breach of a covenant in a lease.

It appeared from the statement of Mr. Vernon Smith, Q.C., that the plaintiff was the freeholder of the "Exmouth" public-house, which was in a crowded thoroughfare. On September 28, 1891, he granted a lease of the house to Mr. Miller (through whom the defendants claimed) for thirty years from September 29, 1891, at a rent of 120*l.* a year. It was then a licensed house but the licence had since been forfeited. There were covenants by the lessee that he was during the term of the lease to keep in all respects in good repair all and every portion of the interior, and to yield up the premises on the expiration of the term to the plaintiff in good repair; and he was not to permit any improper conduct on the premises so as to afford any ground for the discontinuance of the licence. That lease was assigned to defendants in 1894 and they sublet to a tenant named Wright in the same year. It was suggested afterwards that there was not sufficient lavatory accommodation, and there were also complaints as to the way in which the business was carried on. In September, 1897, the licence was refused at the Brewster Quarter Sessions, and also again refused in the autumn of 1898. On September 16, 1898, the defendants applied to the plaintiff for his consent to a structural change of premises, so as to make them adaptable for a shop, but the plaintiff refused. On March 2 plaintiff found out that the defendants had converted the premises into a shop, and he accordingly issued his writ in this action. The defendants had removed partitions and so forth in the interior of the ground floor, and they proposed, in addition to other things, to make one large window in lieu of two windows and a door in Union-street.

Mr. MacNaghten, Q.C., for the defendants, submitted that no case had been made out for an *interim* injunction. If the judge ordered the defendants at the trial to put the premises back into their original condition they were quite willing to abide by any such order, but they desired to carry on the business of a shop in the meantime pending the hearing of the action.

In the result it was arranged that the motion should stand for trial, the defendants undertaking to abide by any order the judge might make at the trial as to restoring the premises to the condition in which they were before the defendants' recent alterations, and also undertaking to apply for a licence at the next sessions, the costs of the motion to be costs in the action.

THE WORKMEN'S COMPENSATION ACT.

A CASE under the Workmen's Compensation Act, 1897, was heard at the Salford County Court on the 27th ult., by Mr. Adshead Elliott, sitting as Arbitrator. The claim was put forward by Jane Mason, widow of Frederick William Mason, of Morecambe, who was killed on February 10 by falling from a scaffold in the Lyceum Theatre, Eccles, which was then in course of erection. Mason was in the employ of Messrs. A. R. Dean & Co., decorators and manufacturers, Birmingham, who were sub-contractors under Messrs. Moore & Sons, builders, Eccles, and the claim was made against Messrs. Dean & Co., the particulars stating that the accident was due to a defective scaffold. Mr. Overend Evans represented Mrs. Mason, Mr. Byrne appeared for Messrs. Dean & Co., and Mr. Jordan represented Messrs. Moore & Sons.

Mr. Overend Evans detailed the circumstances under which the accident occurred, and this was followed by an argument on the question of liability. The claim was against Messrs. Dean & Co., but it was contended that if an award were made against them they could recover the amount from Messrs. Moore & Sons, the original contractors. Mr. Jordan therefore requested the arbitrator to decide whether he could take any part in the present proceedings, as, if an award were made, he would not be in a position to dispute the amount in any subsequent proceedings which might arise between Messrs. Moore & Sons, and Messrs. Dean & Co.

The Arbitrator, while refusing to try the issue as between the two firms, ruled that Mr. Jordan could take part in the present proceedings.

Mr. Cambell, of the firm of Cambell & Horsley, the architects of the Lyceum Theatre, stated that Mr. R. Flanagan, the building owner, contracted with Messrs. Dean & Co. direct for the decorative work, so that they were not sub-contractors under Messrs. Moore & Sons.

Mr. Byrne: Whose business was it to provide the scaffold?—Messrs. Dean said they wanted the scaffold provided free of charge.

Who erected the scaffold?—Messrs. Moore & Sons.

Who paid for the erection?—Mr. Flanagan.

Then it was put up by Moore's, and Moore's were paid for it?—Yes.

The Arbitrator said he had no power to decide any question of Messrs. Moore & Sons' liability.

Mr. A. T. Moore, one of the contractors, said the scaffold was stronger than usually employed for such work.

Mr. Byrne said the only point he raised was under Section 7 of the Act. He submitted that the painting and decorating of the ceiling was not part of the construction of the building. The building was constructed before the ceiling could be painted. He contended that to make an award the arbitrator had to find that the persons at the time of the accident were engaged constructing the building.

Mr. Overend Evans said it was perfectly obvious that a plasterer was a man who did work which was really part of the construction of the building. The fibrous plaster used by the defendants was therefore used in the construction of the building.

The Arbitrator said that if he made an order against Messrs. Dean, they must be deemed undertakers of the work of construction.

Mr. Evans said they were the undertakers of a particular branch. Apart from that there was constructive work being done by somebody, and the building was above 30 ft. high, and there was scaffolding.

Mr. Byrne submitted that Messrs. Moore & Sons were the undertakers, and that Messrs. Dean & Co. were neither undertakers nor sub-contractors. The man was employed by Messrs. Dean, and the action must be against his immediate employers, but they were not undertakers or constructors.

The Arbitrator said the accident happened in the course of the man's employment. He was employed by Messrs. Dean & Co., and there was no doubt that at the time the building was above 30 ft. high, and that scaffolding was in use for the purpose of constructing the building. When the building was incomplete and the scaffolding was still up, and the painting happened to be the first painting, he held that he was employed on a building above 30 ft. high, which was in course of construction. It was a most important point, and he would be willing to state a case for Mr. Byrne if required. The amount of compensation would be £300, the widow to have £20 right away, and the remainder to be invested.

Mr. Evans consented to that.—*Manchester Courier.*

CASE UNDER THE LONDON BUILDING ACT:

LOVEGROVE *v.* NORTH LONDON RAILWAY COMPANY.

MR. HADEN CORSER at the Worship-street Police-court on April 27 heard a summons taken out by Mr. Henry Lovegrove, District Surveyor of South Islington and Shoreditch, for neglect to give notice before erecting a water-closet on vacant land for the use of a tenant of some railway arches. The district surveyor required notice, and that the front wall should be of brick—the other three sides being walls of old buildings.

The roof had not been put on, and the defendants, finding that they could not sustain their claim for exemption, pleaded that the erection of a door and a length of iron and wood was a screen only and not a building. The magistrate took this view and dismissed the summons, but would not allow costs.

CASE UNDER THE PUBLIC HEALTH (BUILDINGS IN STREETS) ACT, 1883.

THE case of Jenkins *v.* The Merthyr Tydvil District Council came before a Divisional Court of Queen's Bench, composed of Justices Lawrance and Channell, on the 29th ult. in the form of a special case stated by the Stipendiary Magistrate of Caerphilly Higher, Glamorganshire, in the matter of the conviction of Mr. E. M. Jenkins on an information laid by the Merthyr Tydvil District Council against him for contravention of Section 3 of the Public Health (Buildings in Streets) Act, 1883. The facts were, shortly, these:—On June 27 last an information was laid against the respondent for that he had without the written consent of the District Council erected and brought forward in Union-street, Dowlais, a house or building beyond the front main wall of the house or building on either side. Section 3 of the Act of 1883 repealing in part Section 156 of the Public Health Act, 1875, makes it an offence to do this, and provides that any person offending against this enactment should be liable to a penalty not exceeding 40s. for every day during which the offence is continued after written notice in this behalf from the Urban Authority. At the hearing no evidence was given that any such written notice as was required by the section had

been given to the respondent, and the magistrate, therefore, on August 4, discharged the information. A second information was then laid on September 26, which charged the continuation of the offence after written notice, and, upon the notice being proved, the respondent was convicted. The question now for the Court was whether the conviction was bad on the ground of the respondent having been previously acquitted by the magistrate. On his behalf it was contended that the first information having been dismissed, the matter was *res judicata* and the conviction wrong.

Their Lordships, however, held that as nothing had been determined by the first summons the matter on the occasion of the second summons was not *res judicata*, and dismissed the appeal.

Mr. S. T. Evans, M.P., appeared for Mr. Jenkins; and Mr. Macmorran, Q.C., and Mr. Plews for the District Council.

ACTION BY ARCHITECTS.

ON the 1st inst. the case of Perry & Reed *v.* Burney & Grimes and another, came before the Lord Chief Justice and a special jury in the Queen's Bench Division. It was an action by the plaintiffs, a firm of architects carrying on business in John-street, Adelphi, to recover 1,030*l.* 15s. 11d. for professional services rendered. The defendants, of 243, Strand, and another defendant, Mr. Albert Mathams, were the owners of the "King's Head Hotel," Margate, and they in September, 1897, consulted the plaintiffs with regard to alterations they proposed making in the structure of the hotel. It was stated that the amount they were prepared to spend was about 8,000*l.* After some negotiation, it transpired that it would be necessary, in rebuilding the frontage of the hotel, to set back the wall, and this involved extra expense. The plaintiffs prepared the plans and submitted them to the Licensing Committee and Town Council, and they were in due course passed. Tenders for the work were then invited, and the lowest that was received was 14,790*l.* The defendants considered this was too much, and refused to spend more than 10,000*l.*, and asked the plaintiffs to reduce their estimate. The plaintiffs then prepared fresh plans, and they applied to the defendants for payment on account. No notice was taken of this application, but Mr. Mathams referred the plaintiffs to the other defendants, Messrs. Burney & Grimes, Mr. Mathams stating that he had sold his interest in the hotel. Messrs. Burney & Grimes declined to pay the amount claimed on the ground that the plans were to be prepared on the basis that the alterations to be made were not to cost more than 8,000*l.*, but they paid 100*l.* into court to meet the claim against them.

In the result, the jury awarded the plaintiffs 800*l.*

Judgment accordingly.

Mr. Tindal Atkinson, Q.C., and Mr. Whateley appeared for the plaintiffs; and Mr. Foote, Q.C., and Mr. Montague Lush for the defendants.

ARBITRATION CASE UNDER THE WORKMEN'S COMPENSATION ACT.

HIS Honour Judge Whitehorne, at the Birmingham County-court on the 27th ult., conducted an arbitration under the Workmen's Compensation Act between Henry Stevens, carpenter and joiner, of Arden-road, Saltley, and Smith, Stone, & Knight, Limited, paper-makers, Landor-street. Mr. Vachell (instructed by Mr. O'Connor) appeared for the applicant, and Mr. Cross for the respondents.—The applicant claimed 1*l.* per week during incapacity, or a lump sum of 200*l.*, as compensation for the loss of his right eye by an accident on August 13 last, whilst in the respondents' employ. Liability was admitted by the respondents, and the question for decision was the amount of the compensation. Applicant had been in the employment of the respondents for twenty-five years. He was struck on the eye by a chip of steel flying from a sledge-hammer in use by another workman. The eyelid and eyeball were perforated, and the vision totally destroyed. His average wages for twelve months before the accident were 2*l.* 8s. a week. He had not been able to work since, but the respondents had paid him 1*l.* a week for nineteen weeks. He had received 12s. a week from his society, together with 50*l.* for the loss of his eye.—Mr. Cross stated that Mr. Smith was willing to take applicant back at full wages on a two years' agreement, and let him do what he pleased.—Applicant: I am quite willing to go, but I cannot work.—Mr. Cross: We are quite prepared to trust you to do what is reasonably right and proper.—Dr. Evans, of the Eye Hospital, and Dr. Priestley Smith said the applicant's vision would never be as good as it was before, and his efficiency as a workman was greatly decreased, but he was competent to do rough work, and his sight would improve with practice.—Mr. Cross submitted that the applicant was entitled to no special compensation for the loss of his eye, or for any suffering he had undergone; his claim was strictly limited to loss of wages, and he was entitled to only half of the difference between what he is now able to earn and his earnings before the accident, with a maximum compensation of £1 a week. — Mr. Vachell contended that the Act gave jurisdiction to the Court to allow compensation for pain and suffering, the words in the first section being "personal injury."—His Honour came to the conclusion that Mr. Cross was right, and that the object of the Act was to give compensation for injuries in so far as they affected the wage-earning capacity of the workman. He fixed the compensation to be paid to the applicant at 16*l.* to the present time (in addition to the 19*l.* already paid to him), and the maximum allowance of 1*l.* a week from now. The offer of the respondents to take the applicant back into their employment at his old wages was most benevolent, but he had to deal with legal rights. If the respondents carried out their benevolent purpose, they would be entitled, in their weekly payments to applicant, to take credit for the amount of the award.—*Birmingham Gazette.*

ACTION AGAINST A BRIGHTON BUILDER FOR ALLEGED TRESPASS.

THE case of Gonnella *v.* Olliver came before a Divisional Court of Queen's Bench on the 3rd inst., on the appeal of the plaintiff, Mr. V. Gonnella, of 93, Bonchurch-road, Brighton, from the decision of the County Court Judge of Sussex, giving judgment for the defendant, a builder, also of Bonchurch-road, Brighton.

It appeared that the plaintiff brought the action to recover from the defendant damages for an alleged trespass by interfering with a wall which the plaintiff asserted was not a party wall. In August, 1898, the defendant sold to the plaintiff the house No. 93, Bonchurch-road, but after the sale the defendant asserted, and proceeded to assert, his right to use one of the walls of the house as a party wall for an adjoining building. Plaintiff contended that an exclusive right to the wall in question had been conveyed to him by the defendant, who reserved no right to use it for the purpose of further building on the house adjoining, which at the time of the conveyance was non-existent. The learned County Court judge held that the wall was a party wall, and gave judgment for the defendant, and their lordships now affirmed his decision and dismissed the appeal with costs.

Mr. Boxall appeared for the plaintiff (appellant), and Mr. Lowe for the defendant (respondent).

MEETINGS.

FRIDAY, MAY 5.

Royal Institution.—Mr. W. J. Russell, Ph.D., F.R.S., on "Pictures produced on Photographic Plates in the Dark." 9 p.m.

Iron and Steel Institute.—Annual meeting (concluded). 10.30 a.m.

Institution of Junior Engineers.—8 p.m.

SATURDAY, MAY 6.

British Institute of Certified Carpenters.—Meeting at Carpenters' Hall at 6 p.m. Lantern lecture on "Timber and Timber Trees" by Mr. J. Hudson Davies.

Edinburgh Architectural Association.—Visit to Peebles: (1) Neidpath Castle; (2) Cross Church; (3) St. Andrew's Tower.

MONDAY, MAY 8.

Bristol Society of Architects.—Annual General meeting. Mr. F. W. Wills on "Speculative Builders and their little ways."

TUESDAY, MAY 9.

Royal Institution.—Professor Silvanus Thompson on "Electric Eddy-Currents." II.—3 p.m.

WEDNESDAY, MAY 10.

Surveyors' Institution.—Annual Dinner, King's Hall, Holborn Restaurant. 6.30 p.m.

THURSDAY, MAY 11.

Carpenters' Hall, London Wall (Lectures on Carpentry and Joinery).—Professor T. Roger Smith on "Temporary Structures: Floors, Shoring." 7.30 p.m.

Royal Institution.—Mr. Lewis F. Day on "Embroidery." II.—3 p.m.

Institute of Builders.—Dinner, Marble Salon, Grand Hotel, Trafalgar-square.—6.30 p.m.

Society for the Encouragement of the Fine Arts.—Second Conversazione, at the Galleries of the Royal Institute of Painters in Water Colours, Piccadilly.

FRIDAY, MAY 12.

Architectural Association.—Dr. G. V. Poore on "Soil and Aspect in Relation to the Dwelling House."—7.30 p.m.

SATURDAY, MAY 13.

Institution of Junior Engineers.—Visit to the Royal Arsenal, Woolwich. Train leaves Charing Cross 9.20 a.m.

RECENT PATENTS:

ACCEPTED SPECIFICATIONS.

Open to Opposition until June 26.

[1898] 6,719, Howl, Drying Bricks and other Plastic Articles. 8,941, Hastwell, Composition for Use in Treating Sewage, &c. 8,961, Heinz & Heinz, Apparatus for Soldering. 9,208-9, Winter, Stoves. 9,226, Lauri, Self-Cleaning Burner for Acetylene Gas. 9,294, Munn, Ventilators. 9,722, Blackie, 15,179, Delmouly, and [1899] 3,551, De Szepczynski, Generation of Acetylene Gas. 10,245, Boltone, Automatical Cut-in and Cut-out. 10,276, King, Windows. 10,278, Walmsley & Kenyon, Pilot Jets for Incandescent Gas Burners. 10,433, Abbott & Bill, Electrical Switches. 10,619, Clemens, Mitering Machines. 10,658, Johnson & Nichols, Gypsum or Plaster of Paris. 10,815, Windham, Burning of Acetylene Gas. 10,818, Hookham, Electricity Meters. 10,897, Gregory, Oil Burners for Lighting or Heating. 11,014, Hay, Lifts, Hoists, &c. 11,478, Simpson, Soldering and Brazing. 11,741, Carter, Ladders. 12,191, Bartenstein, Reflectors chiefly designed for Incandescent Electrical Lamps. 12,368, Cook, Means for Opening Sash Windows Inwardly. 13,060, Page, Curl-ended Nails. 13,298, Shore, Devices for Withdrawing, Collecting, and Sterilising Dust, &c. 13,536, Fauck, Boring Wells. 13,560, Dover & Phipps, Coating Surfaces with Celluloid, &c. 13,594, Miley, Fast Head Stocks of Lathes. 13,667, Hewetson & Lambert, Guard or Shield for Machines fed by Feed-rollers, for Circular Saws, &c. 13,697, Wynne-Roberts, Filter Beds for Filtering Sewage Water, &c. 13,711, Voile, Means for Destroying Soot in Chimneys. 13,969, Wydts & Rochefort, Trembler Interruptors for Electrical Currents. 14,012, Brown, Electrical Light Fittings. 14,265, Kinnell, Valves for Heating Installations. 14,964, Robinson, Circular-saw Guards. 15,449, Cotgreave, Removable and Adjustable Shelvings and their Fittings. 15,596, Rule, Automatical Fire Alarms. 17,071, Offenbacher, Decorated Glass. 19,770, Verbeke, Metallic Mantles for Gas Burners. 20,594, Brisselet, Locks and Keys. 24,592, Thornton, Door Silencer. 25,106, Baker, Rock-boring. 26,082, Bundy, Workmen's Time Recorders. [1899] 1,092, Seeberger, Elevators. 2,059, Stephan, Continuous Treatment of Size by Boiling it. 2,133, Doody, Operating Window Sashes. 3,217, Anderson, Portable Hob Grate. 3,760, Jaeger, Dry-slaking of Lime. 3,799, Sepulchre, Oil-heating Stoves. 4,279, Wernecke, Delivery or Discharging Devices for Moulding Presses, &c. 4,520, Luther, Wood Polish. 4,699, Clayton, Ceiling-rose for Electrical Lights, &c. 5,030, Maccoun, Control Apparatus for Electrical Hoists or Elevators. 5,204, Bremer, Framework Holder for Use in the Construction of Floors. 5,328, Goodfellow, Self-closing Gates, Doors, &c. 5,509, Harris, Saw-blades for Stone-sawing Machines. 5,727, Cornish, Bricks. 5,739. Lamont, Mortising Chisel. 5,810, Thatcher, Roofing Tiles. 5,941, Rice, and 6,024 and 6,026, Allgemeine Elektricitäts G., Electrical Incandescent Lamps.

ABSTRACTS OF PATENTED INVENTIONS.

19.—CHIMNEY AND VENTILATING SHAFT TOPS: *J. D. Wright.*—A pipe, having a spiral outlet, is made by bending a wide strip spiral-wise and with overlapping edges, whilst holes are made in the side to promote the draught; for a ventilator a hood can be added.

28.—BURNERS FOR GAS AND VAPOUR: *J. McConechy.*—The union jet burner, for acetylene and rich oil-gas, has its top made flat or convex, and under the gauze is put absorbent material for removing aqueous vapour.

33.—WASTE WATER FLUSHING: *G., J., & M. Clarke.*—In order that the customary projecting lips may be dispensed with, the back of the tipper is made straight, and a rubber is provided against which it strikes when it is tipped.

67.—HOLDERS FOR ELECTRICAL LAMPS: *H. C. Gover, C. F. Proctor, & W. G. Pipkin.*—Of the two parts in which the insulating-body for a bayonet holder is made, one has two recesses which contain the plunger carriers, and the cylindrical casing of the holder keeps the two parts together, in conjunction with a conical cover which is screwed on to it. By another arrangement each of the two equal halves of the insulator is recessed to receive one plunger carrier, and in another form the plunger carriers can be inserted into the insulator from the top. The plunger carriers are fitted with the wires before they are put into the insulators.

102.—FIREPROOF SHUTTERS AND DOORS: *J. H. McGrouther.*—For doors or shutters that separate the well of a hoist from the successive floors, or prevent the spread of fire, the panels are loosely fitted between the stiles and rails in order that they may expand, and to diminish their warping or buckling when exposed to heat or flame. The rails and stiles are made of bars and distance-pieces, bolted together, and are arranged so that the bars on one side of the panels break joint with those on the other side. The bars, panels, and distance-pieces may be built up of layers, or the panels may slide, by slots, on washers or distance-rings through which the rivets or bolts pass.

110.—ANTI-FOULING COMPOSITIONS AND PAINTS: *W. Peel.*—Gum euphorbium is dissolved in fusel oil or other solvent, and is then mixed with slaked lime and coal tar; to the mixture is added gum dammar dissolved in benzine; then are added oxide of zinc, graphite, and a pigment, after which the admixture is thinned with turpentine, &c.

119.—A FROSTED OR CRYSTALLINE VARNISH: *Blundell, Spence, & Co., and S. Hill.*—For a varnish that shall produce a frosted or crystalline appearance to glass, talc, or other transparent material, or to a painted surface, the inventors make a mixture of pale varnish (three parts), tung oil (one part), and small quantities of resinates or stearates of lead, lime, manganese, and essential oils.

192.—SUPPORTS FOR ELECTRICAL LAMPS: *O. C. White.*—The clamp is fitted on to the base by means of a flange and screw, and has a split yoke that receives a circular block, which is fastened by a clamping bolt and carries a long curved tube with open bushed ends; on the tube's free end is a ball that is clamped adjustably to another ball by side-pieces and a bolt covered with an insulator. A lamp holder may be attached to the latter ball, or be hinged to a tube that slides in the ball, and is secured by springs and a sliding ring.

237.—EXTINCTEURS: *A. C. Rowe.*—The machine discharges liquid or gas according to the position in which it is held; the main vessel, and a bottle whose heavy lid is made air-tight with a liquid seal, contain solution of carbonate and acid, respectively, an inversion of the vessel causes the lid to fall, and the carbonic acid gas thus produced escapes into a second vessel where it is dried by the impact of the gas jet against the vessel's side, and is thence discharged upon the fire, provision being made for reducing the jet's velocity and for preventing air from being carried with it; liquid is discharged upon the re-inversion of the machine.

284.—A SUBSTITUTE FOR EMERY WHEELS: *C. M. Pielsticker.*—These are fashioned, by heat and pressure, from a compound which is formed by heating New Zealand iron-sand in a crucible with carbonaceous matter, and adding a phosphorous-yielding sustance, the red-hot mass is then poured into cold oil, or water covered with cold oil, and a binding material, such as vulcanized rubber is used in the process of moulding.

317.—DIAPHRAGM VALVES FOR CISTERNS, &c.—*J. Jones.*—The object of the invention is to make the central portion of the diaphragm follow the plunger and not adhere to the end of the supply pipe; the diaphragm's central part is screwed to the plunger, or the latter may

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*Masonic Hall	Aldershot Masonic Hall Co.	30*l.* and 10*l.*	No date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Sewers, Bedwas, Wales	St. Mellons R.D.C.	J. Powell, Union Offices, Newport	May 9
Station Buildings, Donabate	G.N.R. Co. (Ireland)	T. Morison, Amiens-st. Terminus, Dublin	do.
Schools, Crookes	Sheffield Sch. Bd.	Holmes & Watson, Archts. Sheffield	do.
Sewerage Works	Todmorden T.C.	C. R. Pease, Surv. Town Hall	do.
Cottage, Buckfastleigh Station, Devon	G.W.R. Co.	G. K. Mills, Paddington Station	do.
Seventy-six Workmen's Dwellings	Barnes U.D.C	G. B. Tomes, Offices, High-st. Mortlake	do.
Fire Station, Market Meadow-road, St. Mary Cray	Bromley R.D.C.	W. J. Winter, Surv. Station-rd. Sidcup	do.
*Road Making Works	Willesden D.C.	O. C. Robson, Offices, Dyne-rd. Kilburn	do.
Sewerage Works	Oldham Corp.	Boro Surv. Town Hall	May 10
Alterations to Workhouse	Bangor Union	R. Davies, Archt. Bangor	May 13
Church, Milford, Cork	----	M. A. Hennessy, Archt 74, South Mall, Cork	do.
Paving Works	Burnley Corp.	G. H. Pickles, Boro Surv. Town Hall	do.
Drainage Works	Southam R.D.C.	F. P. Trepess, Surveyor, Warwick	do.
*Tarred Limestone Paving	Paddington Vestry	G. Weston, Vestry Hall, Harrow-rd. W.	May 15
*Road Making	Hanwell U.D.C.	S. W. Barnes, Church-rd. West, Hanwell, W.	do.
Additions to Workhouse	Herne Common (Kent) Union	J. E. Burch, 39, Castle-st. Canterbury	do.
Three Villas at County Asylum, Morpeth	Northumberland C.C.	J. Cresswell, County Archt. Moot Hall, Newcastle-on-Tyne	do.
Chapel, Wath-upon-Bourne	Primitive Methodist Connexion	W. G. Smithson, Archt. 13, Bond-st. Leeds	do.
*Electric Light Station and Chimney Shaft	Bexhill U.D.C.	A. H. Preece, 13, Queen Anne's Gate, S.W.	do.
*Two Libraries, Lewisham and Forest Hill	Lewisham Vestry	J. Andrews, 13, Basinghall-st. E.C.	May 16
*Schools	Edmonton S.B.	H. W. Dobb, 110, London Wall, E.C.	do.
*Sewering, Levelling, Paving, &c.	Bromley U.D.C.	Surveyor, Council Offices, Bromley	do.
Street Works	Chertsey U.D.C.	J. F. Stow, Surv. Windsor-st. Chertsey	do.
Electric Lighting Materials	Fleetwood U.D.C.	T. Barton, Engr. Ainsworth-st. Blackburn	do.
*Making-up Road	Tottenham U.D.C.	P. E. Murphy, 712, High-rd. Tottenham	do.
*Paving	Greenwich B. of W.	141, Greenwich-rd. S.E.	May 17
*Eight Cottages and Construction of New Street	L. & N. W. & G. W. Joint Rlys.	Engr. Shrewsbury Station	do.
Chapel, Llandegfan	----	J. Owen, Archt. Menai Bridge	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Electricity Buildings, Doughty-rd.	Grimsby U.D.C.	M. Petree, C.E. Town Hall-square	May 20
*Sewerage Works, Kirby Muxloe	Blaby R.D.C.	J. B. Everard, 6, Millstone-lane, Leicester	May 22
*Infirmary Wards, &c.	Tendring Union	F. Whitmore, Chelmsford	May 23
School, Trowbridge	----	G. Fleetwood, Archt. 2, New-court, Lincoln's Inn, London, E.C.	do.
*Chimney Shaft and Alteration to Boiler House	Metropolitan Asylums Board	Office, Norfolk House, Norfolk-st. W.C.	May 24
*Painting, Repairs, Cleaning, &c.	St. George's Union	E. T. Hall, 57, Moorgate-st. E.C.	do.
*Pulling-down and Removal of Buildings	Islington Vestry	Vestry Hall, Upper-st. N.	do.
*Repaving with Jarrah Wood	Hampstead Vestry	Surveyor, Vestry Hall	May 25
*Sinking a Well	Greenwich Union	T. Dinwiddy, 12, Croom's-Hill, Greenwich	May 26
Baths	Cheltenham Corp.	J. Hall, C.E. Municipal Offices, Cheltenham	May 30
Asylum, Talgarth, Wales	----	Giles, Gough, & Co. 28, Craven-st Charing Cross	do.
*Iron or Steel Winches	James Syn. Ltd.	Offices, 18, Bullter-st, E.C.	do.
*Erection of Asylum	Brecon and Radnor Asylum Com.	Giles, Gougl. & Trollope, 28 Craven-st, W.C.	do.
*Installation of Telephones, Fire Alarms, Call Bells, Clocks, &c.	L.C.C. Asylums Com.	R. W. Partridge, Office, 6, Waterloo-place, S.W.	May 31
*Electric Light Installation	Islington Guardians	W. Smith, 65, Chancery-lane, W.C.	June 1
*Repair and Redecoration of Chapel Buildings	Woodberry Down Chapel	W. Bradbear & Co. Canonbury Station, N.	No date
Rebuilding St. Peter's, Bury	----	M. Taylor, Archt. 2, St. Ann's Churchyard, Manchester	do.
Additions to Shop Premises, Park-rd. Bradford	..	J. Young & Co. Archt. 62, Market-st. Bradford	do.
Works at Gilstead Hall, Bingley	Mr. A. England	Isitt, Adkin, & Hill, Archt. Bradford	do.
Alterations to House and Shop, West-end, Morecambe	J. Wright	Marshall Bros. Archt. Back-crescent, Morecambe	do.
Theatre, Stockton-on-Tees	----	H. May, Archt. 24, North John-st. Liverpool	do.
Two Houses, Alma-road, Rotherham	----	G. H. Johnson, Archt. 38, High-st. Rotherham	do.
Alterations to Golden Otter Inn, Newcastle	----	A. P. Farthing, Archt. 21, Pilgrim-st. Newcastle	do.
Three Cottages, Cherry-st. Warwick	----	R. Hutton, 17, Jury-st. Warwick	do.
Workshops, Baltimore Works, Longton	----	W. Wood, Archt. Stafford-st. Longton	do.
*Painting, &c.	War Dept.	R. E. Office, N. Aldershot	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in.
*Clerk of Works	Reigate T.C.	3*l.* 3s. per week	May 9
*Building Inspector	Wood Green U.D.C.	52s. 6d. week	do.
*Clerk of Works	Peterboro T.C.	3*l.* per week	May 11
*Clerk of Works	Bethnal Green Vestry	4*l.* 4s. per week	do.
*Chief Clerk	Camberwell Vestry	140*l.* rising to 150*l.*	May 12
*Orders Clerk	do.	90*l.* rising to 130*l.*	do.
*Road Surveyor	Croydon R.D.C.	400*l.* per annum	May 17
*Surveyor	Metropolitan Asylums Board	500*l.* per annum	May 19

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. iv. Contracts, pp. iv. vi. viii. x. & xxii. Public Appointments, pp. xix. & xxii.

pass through the former—which has a flange or collar with a facing; a slot in the end of the plunger engages the actuating lever.

327.—WALL COVERINGS: *J. E. Farrow.*—During the process of printing, perforations are made in the edges of the paper-hangings in order to facilitate the removal of the plain portions or trimmings; the perforations are of varied shapes, and are formed to inter-lock when the edges are joined, thus making the patterns or designs fit properly together.

374.—BALL AND FLOAT VALVES: *O. H. Wagner.*—The valve receives a reciprocating motion from the rotation of the tubular portion of the supply valve by means of the float lever and a pin which carries rollers that engage with grooves, a sleeve which is fitted upon a reduced portion of the neck of the casing prevents the detachment of the rollers, and an extension from the valve enters a recess in the cap.

384.—LOCKS AND LATCHES: *W. S. Johnson.*—For decreasing friction the latch bolt of a rim or mortise lock or latch moves between roller guides, or is itself fitted with rollers, a hinged plate or double fore-end, which covers the oil-holes made in the fore-end of the case, is held in position by a removable screw, and can be turned back when the lock is to be oiled.

427.—EXCAVATORS: *E. Bock & L. N. Jackson.*—On trucks is mounted a bridge, or girder, which carries an engine and boiler, a pair of bucket chain excavators, and a crane at each end for moving forward the rails and trucks; the excavators, one on each side of the bridge, are connected so that the overhanging bucket mechanism needs not to be counterbalanced, and the length of the bridge can be altered by means of detachable end-sections.

433. WORKSHOPS: *P. W. Gates.*—Two of four lines of main shafting are carried upon wall brackets near the floor to drive counter-shafting in wall-shafting, whilst the other two are placed underneath the floor and drive shafting supported by columns; a travelling crane runs overhead upon girders supported by wall-brackets, and in the case of a low roof a break is made in the lines of the columns which carry the shafting.

462.—CONDUITS FOR ELECTRICAL CONDUCTORS: *G. H. Nisbett.*—The conduits or mains, made of glazed earthenware, &c., in sections, are set to contain either bare or lightly insulated or armoured conductors of any pattern, the troughing, having an outer section, either circular or rectangular, is preferably rounded upon its lower inner surface, and has movable or fixed bridge-pieces upon which the conductor rests, the remaining space may be filled with bituminous material; one cable or more may be put into each of the troughs, which are jointed together, their lids being cemented into position. For making branches the section ends are chamfered.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

April 19.—By R. & A. G. THOROWGOOD (at New Barnet).

New Barnet, Herts.—Lancaster-rd., two plots of building land, f. £417

April 20.—By W. BROWN & Co. (at Great Missenden).

Prestwood, Bucks.—Enclosures of land with farm buildings thereon, 58 a. 2 r. 4 p., f. 1,900

By ELLIOTT, ELLIS, & Co. (at Plymouth).

Plymouth.—173 and 174, Union-st., area 6,220 ft., f., r. 100*l.* 6,000

2, Union-ter., area 2,625 ft., f., r. 35*l.* 1,250

By J. G. Medcalf (at Market Deeping).

Market Deeping, Lincs.—An essential oil distillery and manufactory, with residence; also the Hall Farm and other lands, 292 a. 1 r. 19 p., f. and c. 15,100

Enclosures of land, 41 a., f. and c. 830

A freehold house and shop, also a plot of garden ground, 1 a. 2 r. 35 p. 485

A freehold house and 5 a. 0 r. 4 p. 630

A freehold house, also eight cottages 1,085

Langtoft, Lincs.—A freehold and copyhold farm, 83 a. 0 r. 29 p. 2,800

Two parcels of land, 20 a. 2 r. 5 p., f. and c. 710

By A. DOWELL (at Edinburgh).

Dunkeld, Perthshire.—The Estate of Cardney, 1,074 a. 15,050

April 21.—By TAYLER & GERRISH (at Chipping Sodbury).

Old Sodbury, Glos.—Trueman's Farm, 41 a. 0 r. 29 p., f. 2,845

By WINTERTON & SONS (at Lichfield).

Whittington, Staffs.—The Hill Farm, 78 a. 2 r. 37 p. f. 3,900

Hall Croft Close, 4 a. 0 r. 10 p., f. 350

Moorshutt and Old Foot Closes, 14 a. 1 r. 29 p., f. and c. 560

The Tracehays Closes, 30 a. 0 r. 24 p., f. 1,275

The Whittington Hurst Farm, 95 a. 1 r. 18 p., f. 2,900

April 22.—By JAMES D. O'BRIEN (at Sligo).

Annaghloy, co. Sligo.—The Estate of Annaghloy and Muck Island, 165 a. 2,655

April 24.—By MAY & PHILPOT.

Brixton.—169, Leander-rd., u.t. 90½ yrs., g.r. 10*l.*, r. 60*l.* 575

By J. G. PERRY.

Clapham.—85, Blomfelde-rd., u.t. 63 yrs., g.r. 7*l.* 14s., r. 52*l.* 10s. 465

11, Grafton-sq., u.t. 67 yrs., g.r. 8*l.*, r. 48*l.* 465

31, Cautley-av., u.t. 85½ yrs., g.r. 14*l.* 5s., r. 55*l.* £505

33, Sibella-rd., u.t. 63 yrs., g.r. 12*l.*, e.r. 70*l.* 720

67 and 69, Old Town, and two cottages in the rear, u.t. 22 yrs., g.r. 60*l.*, r. 157*l.* 540

18, 19, 20, 21, and 23, Crescent-grove, u.t. 73½ yrs., g.r. 60*l.*, r. 295*l.* 2,620

By J. C. PLATT.

Battersea.—38, Savona-st., f. 270

Hammersmith.—57 and 59, Richford-st., u.t. 71 yrs., g.r. 13*l.* 410

Westbourne Pk.—38, Lancaster-rd., u.t. 64½ yrs., g.r. 10*l.* 455

Dartford, Kent.—6 and 8, Lowfield-st., f., r. 84*l.* 1,930

By THOMAS, PEYER, & MILES.

Fenny Stratford, Bucks.—The Fenny Stratford Brewery, with wharfage and nine public and beer-houses, f. 14,550

By Messrs. KEMSLEY.

Romford, Essex.—Crow-lane, enclosure of building land, 28 a. 0 r. 15 p., f. 6,100

Theydon Bois, Essex.—Red Oaks and 2 a., f. 1,600

Hackney.—Clarence-rd., &c., i.g.r. 45*l.*, u.t. 39 yrs., g.r. 6*l.* 4s. 740

Stapleford Abbotts, Essex.—Grove House and 22 a. 0 r. 20 p., f. 1,350

Two freehold cottages, and 1 r. 150

Two cottages and enclosures of land, 7 a. 0 r. 6 p., f. 405

Dagenham, &c., Essex.—Two parcels of land, 3 a. 0 r. 1 p., f. 150

By PHILIP DAVIES (at Presteigne).

Presteigne, Radnor.—Litton Cottage Farm and lands, 8 a. 2 r. 6 p., f. 280

High-st., a freehold residence 460

By P. COOPER & SON (at Aberdeen).

Auchterless, &c., Aberdeenshire.—The Estate of Blackford, 1,381 a. 19,475

April 24 and 25.—By GEORGE T. SMITH (at Devizes).

Devizes, Wilts.—The Estcourt Estate, about 467 a., f. (in numerous lots) 25,998

April 25.—By THEODOR BUHL.

Chipstead, Surrey.—Starrock-lane, The Firs, and 9¼ a., f. 3,700

By EASTMAN BROS.

Anerley.—18 to 26 (even), St. Hugh's-rd., u.t. 68½ yrs., g.r. 25*l.* 620

Blackfriars.—78, Blackfriars-rd., u.t. 27 yrs., g.r. 17*l.*, r. 112*l.* 750

By HARMAN BROS.

Shepherd's Bush.—284, Goldhawk-rd., u.t. 64 yrs., g.r. 33*l.*, r. 133*l.* 750

64, Wood-la., f., r. 50*l.* 710

20 to 23, Caithness-rd., u.t. 67 yrs., g.r. 26*l.*, r. 143*l.* £1,230
Harrow, Middlesex.—1, 2, and 3, Wealdstone-ter., f., r. 117*l.* 2,680

By MERRETT & MOULD.

Hounslow, Middlesex. — Hounslow-rd., South Lodge, and 1 a. 0 r. 1 p., f. 600

By HAMPTON & SONS.

East Liss, Hants.—Lingwood, and 7 a. 3 r. 11 p., f. 6,000
Rickmansworth, Herts.—Scots Hill, and 1½ a., f. 3,000

By C. W. DAVIES.

City-rd.—8, Colebrook-row, f., e.r. 70*l.* 1,150
King's Cross.—4, 5, and 6, Providence-row, f..... 500
Highbury.—87 and 89, Highbury Hill, u.t. 60½ yrs., g.r. 25*l.*, e.r. 120*l.* 1,010
Dalston.—103, 105, and 107, Dalston-la., u.t. 83 yrs., g.r. 62*l.* 10s..... 865
Bath-row, Dalston Chambers, u.t. 83 yrs., g.r. 7*l.*, r. 50*l.* 480

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent yd. for yard, &c.

PRICES CURRENT OF MATERIALS:

WOOD.*

Per Petersburg standard hundred.

	£	s.	d.	£	s.	d.
White Sea: first yellow deals	17	0	0	18	0	0
Second do.	13	5	0	14	15	0
Third do.	10	15	0	11	15	0
Battens, 40s., 30s., and 15s. less respectively.						
Petersburg: first yellow deals	11	15	0	14	5	0
Second do.	10	15	0	12	5	0
Battens, 30s. and 20s. less respectively.						
Petersburg, white deals	9	15	0	11	15	0
Do. white battens	7	10	0	9	0	0
Riga, white deals	8	5	0	9	5	0
Swedish mixed yellow deals	13	5	0	16	15	0
Third do.	12	5	0	14	5	0
Fourth do.	10	15	0	11	15	0
Fifth do.	9	15	0	10	15	0
Battens, 30s., 20s., and 10s. less respectively.						
Whitewood, 10 to 20 per cent. less.						
Finnish unsorted yellow deals	9	15	0	10	5	0
Battens, 10s. and 5s. less respectively.						
Whitewood, 5 to 10 per cent. less.						
Norwegian second yellow battens	7	10	0	8	10	0
Third do.	7	0	0	8	0	0
Fourth do.	6	10	0	7	10	0
Whitewood, 10s. less.						
Danzig, Crown Deck deals, per 40 ft. 3 in.	0	15	0	1	5	0
Brack	0	12	0	1	0	0
St. Lawrence Pine deals, &c., per P.S.H.:—						
1st, Bright and Dry, regular sizes	18	15	0	25	5	0
,, ,, oddments	11	15	0	18	10	0
2nd ,, regular sizes	13	15	0	17	0	0
,, ,, oddments	9	5	0	12	15	0
3rd ,, regular sizes	9	0	0	10	0	0
,, ,, oddments	6	15	0	8	5	0
4th ,, regular sizes	6	0	0	7	0	0
,, ,, oddments	5	10	0	6	10	0
St. Lawrence Spruce deals, &c.						
First, regular sizes	8	5	0	10	5	0
Second ,,	7	5	0	8	5	0
Third ,,	7	0	0	7	15	0
Fourth ,,	5	15	0	6	15	0
Oddments and battens at 20s., 10s., 7s. 6d., and 5s. less respectively.						
New Brunswick Spruce deals, &c.	7	0	0	7	15	0
Oddments, battens, and fourths	6	5	0	7	5	0
United States pitch pine planks and boards	9	5	0	12	15	0
Prepared Boards, per square						
1¼ by 6½ and 7 in. 1st yellow		12	0		15	3
,, ,, 2nd ,,		10	6		12	3
¼ by 6½ and 7 in. 1st ,,		9	0		11	3
,, ,, ,, white		8	6		9	3
,, ,, 2nd yellow		8	6		10	3
,, ,, ,, white		7	0		7	9
⅞ by 6½ & 7 in. 1st & 2nd yellow		7	9		8	6
,, ,, ,, white		7	3		8	0
¾ by 6½ and 7 in. 1st yellow and white (grooved, tongued, and beaded)		6	9		9	3
¾ by 6½ and 7 in. 2nd yellow and white (ditto)		5	9		8	0
⅝ by 6½ and 7 in. 1st yellow and white (ditto)		5	9		6	6
⅝ by 6½ and 7 in. 2nd yellow and white (ditto)		5	3		6	0
Narrower widths at 10 per cent. less. 3rd quality at 15 per cent. less than 2nd.						
Danzig and Memel Fir Timber— per load						
Best middling	2	10	0	3	10	0
Good middling and Second	2	0	0	3	5	0
Common middling	1	10	0	2	10	0
Undersized	1	10	0	1	15	0
Swedish and Norwegian Balks	1	5	0	1	15	0
Baltic Oak Timber—						
Danzig and Stettin—Large	3	10	0	4	0	0
Small	2	0	0	2	5	0
Quebec Timber per load						
Yellow Pine	4	10	0	6	5	0
Oak	4	5	0	6	5	0
Elm	4	15	0	5	15	0
Ash	4	15	0	5	15	0
Birch	4	0	0	5	5	0
New Brunswick, &c., Birch	3	10	0	5	10	0
American Pitch Pine Timber	2	5	0	3	0	0
Wainscot, per log, 18 cubic ft.—	2	14	0	3	3	0
Crown (Eng. & Dutch) } nominal	4	10	0	6	5	0
Brack } nominal	3	15	0	4	15	0

* The prices for wood are shipping prices. Ten per cent., approximately, should be added in order to arrive at the current trade prices.

	£	s.	d.	£	s.	d.
Lathwood, per cubic fathom—						
Petersburg	4	0	0	6	10	0
Riga and Danzig	4	10	0	5	10	0
Norway Poles, per ft. run	0	0	1	0	0	1½
Oak Staves, per mille full size pipe						
Memel, Crown	210	0	0	220	0	0
Brack	180	0	0	190	0	0
Danzig	165	0	0	175	0	0
Bosnia, single Barrel (nominal)	28	0	0	30	0	0
United States, Pipe	35	0	0	42	10	0
Hogshead, extra heavy and double extra	27	10	0	32	10	0
Indian Teake .....per load	11	15	0	16	15	0
British Guiana Greenheart	0	0	0	8	0	0
Mahogany, per foot superficial—						
Honduras, cargo average	0	0	4½	0	0	6
Nicaragua, do.	0	0	4½	0	0	5½
Tabasco, do.	0	0	4	0	0	6½
Mexican, do.	0	0	3½	0	0	4
Panama, do.	0	0	3	0	0	4
African, do.	0	0	3½	0	0	5
Cuba, do.	0	0	5½	0	0	7½
St. Domingo, do.	0	0	5	0	0	7
Do. Curls (good to prime)	0	0	9	0	1	3
Walnut, American (logs)	0	2	0	0	4	6
Do. do. (planks and boards)	0	2	0	0	7	6
Italian, per foot superficial	0	0	3	0	0	7½
Black Sea, per ton	6	0	0	12	0	0
Satin Walnut (logs) per foot cube	0	1	0	0	1	3
,, ,, (planks and boards)	0	2	0	0	2	9
Sequoia (Californian redwood), per foot cube	0	1	9	0	2	0
Whitewood, American .....(logs)	0	1	3	0	1	6
,, ,, (planks and boards)	0	1	6	0	2	9
Quartered oak ,, ,, ,,	0	2	3	0	4	0
Kauri pine.....(logs)	0	1	9	0	2	0
,, ,, ...(planks)	0	2	3	0	2	9
Jarrah .....(planks)	0	2	3	0	2	6
Lancewood spars each, fresh and large	0	7	0	0	10	0
Lancewood spars, ordinary to fair	0	4	0	0	6	0
Degame spars	0	8	0	0	12	6

METALS.

IRON—Pig, in Scotland ..... ton	3	3	9	0	0	0
Bar, Welsh, in London	6	0	0	6	5	0
Do. do. at works in Wales	5	15	0	5	17	6
Do. Staffordshire, in London	6	5	0	7	10	0
COPPER—British cake and ingot	79	10	0	80	0	0
Best selected	80	0	0	81	0	0
Sheets, strong	82	0	0	84	0	0
Chili bars	76	5	0	0	0	0
YELLOW METAL .....lb.		7d.			7½d.	
LEAD—Pig						
Spanish .....ton	14	5	0	0	0	0
English Com. Brands	14	10	0	0	0	0
Sheet, English, 6 lbs. per sq. ft. and upwards	15	10	0	0	0	0
Pipe	16	0	0	0	0	0
ZINC—English sheet .....ton	30	15	0	0	0	0
Vieille Montagne	31	5	0	0	0	0
Spelter	28	10	0	29	0	0
TIN—Straits	120	5	0	0	0	0
Australian	117	15	0	118	5	0
English Ingots	120	0	0	121	0	0
Banca	114	0	0	0	0	0
Billiton	113	0	0	0	0	0

OILS.

Linseed .....ton	17	12	6	0	0	0
Cocoanut, Cochin	29	10	0	0	0	0
Do. Ceylon	25	15	0	0	0	0
Palm, Lagos	24	10	0	0	0	0
Rapeseed, English, pale	22	15	0	0	0	0
Do. Brown	21	5	0	0	0	0
Cottonseed ref.	16	10	0	17	10	0
Oleine	17	0	0	19	0	0
Lubricating U.S.	0	5	3	0	7	6
Do. Black	0	5	0	0	6	6
TAR—Stockholm.....barrel	1	6	6	0	0	0
Archangel	1	0	0	0	0	0
Turpentine	34	10	0	0	0	0

TO CORRESPONDENTS.

S. F. H. (Amounts should have been stated.)

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TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated by the name and address of the sender; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ABER.—For the erection of forty houses at Aber, Bargoed, for the Powell Duffryn Steam Coal Company, Limited. Mr. Geo. Kenshole, architect, Duffryn House, Ystrad Mynach:—

T. Evans	£10,549 0	J. C. Richards	£7,389 10
Jenkins & Sons	8,270 0	Williams & Sons	7,840 0
D. W. Rosser	8,265 0	Davies Bros.	7,613 3
Marsh & Wride	8,210 0	James & Sons, Penygraig, Rhondda Valley*	7,535 0
W. Harris	8,107 0		
Lewis Davies	8,075 0		
Morgan & Sons	8,045 13		
Jones Bros.	8,026 10		

ASHTON-UNDER-LYNE.—For alterations and extensions to the New Jerusalem school and church. Messrs. J. H. Burton & J. A. Percival, architects, Ashton-under-Lyne:—
Edwin Marshall, Ashton-under-Lyne (amended tender)* £689
[Eight tenders were received.]

CARDIFF.—For the erection of club premises, Barry, for the Conservative Club Company, Ltd. Mr. G. Thomas, architect, Queen's Chambers, Cardiff. Quantities by the architect:—
Richards & Evans, Barry* £2,475
[Revised estimate]

EAST MOLESEY.—For erecting three pairs of semi-detached villas and a detached villa for Mr. J. H. Bray, Bridge House Estate, East Molesey. Mr. H. Knight, architect, London:—
Chase & Son* £6,155

EAST MOLESEY.—For erecting a detached villa. Mr. H. Knight, architect, London:—
Braid, Pater, & Co.* £1,120

ESHER.—For erecting five villa residences, for Mr C. C. Wyllie. Mr. H. Knight, architect, London:—
Wheatley & Sons* £8,100

ESHER.—For erecting six detached villas, Claremont Park Estate, Esher, for the Hon. C. J. Foley. Mr. H Knight, architect, London:—
Braid, Pater, & Co.* £5,500

GUILDFORD.—For the erection of new residence at Warwick Bench, Guildford. Messrs. Peak & Lunn, architects, Guildford:—
Martin & Co., Tonbridge, Kent* £1,702

LEWES (Sussex).—For the erection of a cattle ring in the market, for Mr. J. R. Thornton. Messrs. Findlay & Roques, architects and surveyors, London:—
Knight ..... £249 15 | Errey* £227

LONDON.—For rebuilding 125 and 126, Long Acre, for Mr. C. W. Woollard. Mr. E. R. Burch, architect, 1, Gresham-buildings, Basinghall-street, E.C.:—

Bywaters	£7,390	A. Bush	£7,035
Patman & Fotheringham	7,296	Killby & Gayford	6,835
Lawrence & Sons	7,120	Blyton & Sons	6,770
Kirby	7,050	F. G. Minter, Westminster*	6,700

LONDON.—For the erection of shops and stabling at High-street, Clapham. Mr. Francis P. Bacon, architect:—

Hoskins	£4,741	Howell J. Williams	£3,250
Godson & Sons	4,378	W. Tout	3,025
Faulkner & Sons	3,929		

LONDON.—For the erection of a block of residential flats, Globe-road, E.:—
Holt & Sons, Croydon £24,108

LONDON.—For new staircase and alterations, Suffolk-lane, Cannon-street, for Messrs. James Truscott & Son. Mr. G. Gordon Stanham, architect, 100B, Queen Victoria-street, E.C:—
J. Appleby, Cornwall-road, S.E.* £3,355

LONDON.—For reinstatement after fire, of warehouse, 12, Finsbury-street, E.C., for the executors of John Mirams. Mr. G. Gordon Stanham, architect, 100B, Queen Victoria-street, E.C.:—

F. & H. F. Higgs	£1,643	Turnbull & Son	£1,450
Killby & Gayford	1,628	J. Greenwood	1,371
Patman & Fotheringham	1,573	J. Appleby, Cornwall-road, S.E.*	1,282

LONDON.—For new staging and alterations for Messrs. J. Liversidge & Son:—
J. Appleby, Cornwall-road, S.E.* £200

LONDON.—For alterations and additions at 28, Kensington High-street, W., for Mr. A. De Maria:—
Buckeridge Bros.* £1,181

LONDON.—For erecting a warehouse, Carey-street, Westminster, for Messrs. Coppin Bros. & Co. Mr. H. W. Budd, architect:—

Carmichael	£4,196	Mowlem & Co.	£3,129
Patman & Fotheringham	3,993	Martin, Wells, & Co.	3,049
Snewin Bros. & Co.	3,204	Brookling	2,997
		Bush	2,857

LONDON.—For pulling down and rebuilding "Prospect House," Enfield Highway, N., for Messrs. Truman, Hanbury, & Buxton, Limited. Mr. Bruce J. Capell, architect, 139, Whitechapel-road, E.:—
Lawrence & Son, Waltham Abbey* £3,061

LONDON.—For alterations to the "Green Dragon" public-house, Fleet-street, for Mr. T. R. Manders. Mr. H. Knight, architect, London. Quantities by Mr. H. Branch, 25, Cheapside:—
Nicks & Co.* £5,300

LONDON.—For alterations to the "Blue Anchor" public-house, Fenchurch-street, for Mr. C. W. Shannaw. Quantities by the architect, Mr. H. Knight:—
Lascelles & Co.* £1,800

LONDON.—For alterations to the "Rose and Crown" public-house, Ship Tavern-passage, Gracechurch-street, for Messrs. Seaton & Webb. Quantities by the architect, Mr. H. Knight:—
Turtle & Appleton* £3,700

[*See also next page.*

LONDON.—For erecting Starr's Restaurant, Shoe-lane, for Messrs. Watney, Coombe, Reid, & Co. Mr. H. Knight, architect, London. Quantities by Mr. H. Branch, 25, Cheapside, E.C. :—

Chase & Son*	£3,970

LONDON.—For alterations to Nos. 272 and 274, Edgware-road, for the executors of the late E. Grove. Mr. H. Knight, architect :—

Chase & Son*	£590

LONDON.—For alterations to "The Golden Anchor," Golden-lane, E.C., for Mr. G. Monger. Quantities by the architect, Mr. H. Knight :—

Barlow & Roberts*	£1,340

LONDON.—For rebuilding Nos. 71 and 72, Aldermanbury, E.C. Mr. H. Knight, architect, London :—

Braid, Pater, & Co.	£5,000

LONDON.—For alterations to the "Manchester Hotel," Aldersgate-street, for the "Manchester Hotel" Company. Mr. H. Knight, architect, London. Quantities by Mr. H. Branch, 25, Cheapside :—

B. E. Nightingale*	£2,300

LONDON.—For alterations to the "King's Head," Old Jewry, for Mr. C. J. Shannaw. Mr. H. Knight, architect, London :—

Lascelles & Co.*	£300

LONDON.—For the erection of shop and business premises, No. 124, High-street, Clapham, S.W., for Mr. J. A. Taylor. Mr. Herbert Brinsley, architect, 30 and 31, New Bridge-street, E.C. Quantities by Mr. Henry Bushell, 33, New Bridge-street, E.C. :—

Lyle Manufacturing Company	£5,915	Holliday & Greenwood	£5,155
Freeman & Son	5,915	Woodward & Co.	5,100
J. & C. Bowyer	5,293	George Parker	4,890
John Greenwood	5,237	J. V. Olver, London*	4,771

LONDON.—For decorations to the interior of Latimer Chapel, Mile End, E. :—

Heard & Co.*	£110

LONDON.—For rebuilding the "Jolly Gardeners" beer-house, York-road, Battersea. Mr. F. A. Powell, architect, 344, Kennington-road :—

Burman	£1,669	W. Smith	£1,579
Parsons	1,645	W. Hammond*	1,490
W. Smith	1,625		

LONDON.—For alterations and additions to the "Duke of Cumberland," High-street, Kensington, for Mr. G. L. Mosley. Messrs. W. E. Latchford & Co., surveyors, 51, High-street, Clapham, S.W. :—

Hibberd Bros., Ltd.	£2,380	Barker & Co., Ltd., Kensington*	£1,797
W. R. Williams	2,189		

MILFORD HAVEN (South Wales).—For the erection of a vicarage at Milford Haven, for the Rev. E. J. Howells. Messrs. Wood & Gaskell, architects, Milford Haven, and No. 1, Finsbury Circus, E.C. Quantities by Mr. Henry Bushell, 33, New Bridge-street, E.C. :—

K. Cole	£1,997	Phelps & Owen, Milford Haven*	£1,895
Cole & Sons	1,950		

SHEFFIELD.—For alterations to premises in Ellin-street, Sheffield, for the Ecclesall Industrial and Provident Society, Limited. Messrs. Hall & Fenton, architects, 14, St. James'-row, Sheffield. Quantities by the architects :—

C. Portas	£374 5	Martin & Hughes	£319 0
Hy. Boot	367 0	C. H. Gillam	316 10
Chas. Farrow	348 11	Abby & Son	308 10
Vasey & Son	339 0	T. Margerrison	304 0
Allen & Banks	335 10	Hancock, Horam-road*	273 0
E. Neson	332 0		
A. Turner	330 0		

WESTBURY-UPON-TRYM.—For the execution of sewage outfall works, for the Barton Regis Rural District Council. Mr. A. P. I. Cotterell, C.E., 7, Baldwin-street, Bristol. Quantities by Engineer :—

A. J. Beaven	£18,300 0 0	Weldon, Birmingham*	£12,084 12 11
A. Krauss	15,870 0 0	Smith & Sons†	11,499 14 0
Meredith	14,495 0 0	J. & T. Binns (informal)	10,444 8 10
Shattock	12,733 0 0		

† Withdrawn.

WHITCHURCH (Cardiff).—For the erection of semi-detached villas at Station-road, Whitchurch. Mr. D. Pugh-Jones, architect, Grongar House, Llandaff :—

T. Taylor, Pontypridd*	£1,140

WOLVERHAMPTON.—For the erection of schools, Gatis-street, for the St. Andrew's School Managers. Mr. F. H. Lynes, architect, Lichfield-street, Wolverhampton :—

Willcock & Co.	£2,850	H. Gough	£2,670
F. W. Beard	2,835	J. Herbert, Hartley-street*	2,645
F. L. Jones	2,834	G. Cave	2,587
T. Tildesley	2,688		
T. Skett	2,685		

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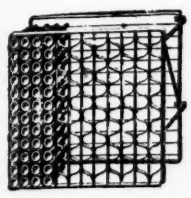

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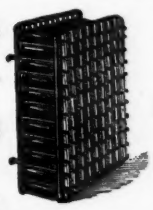

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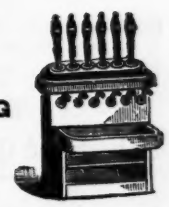

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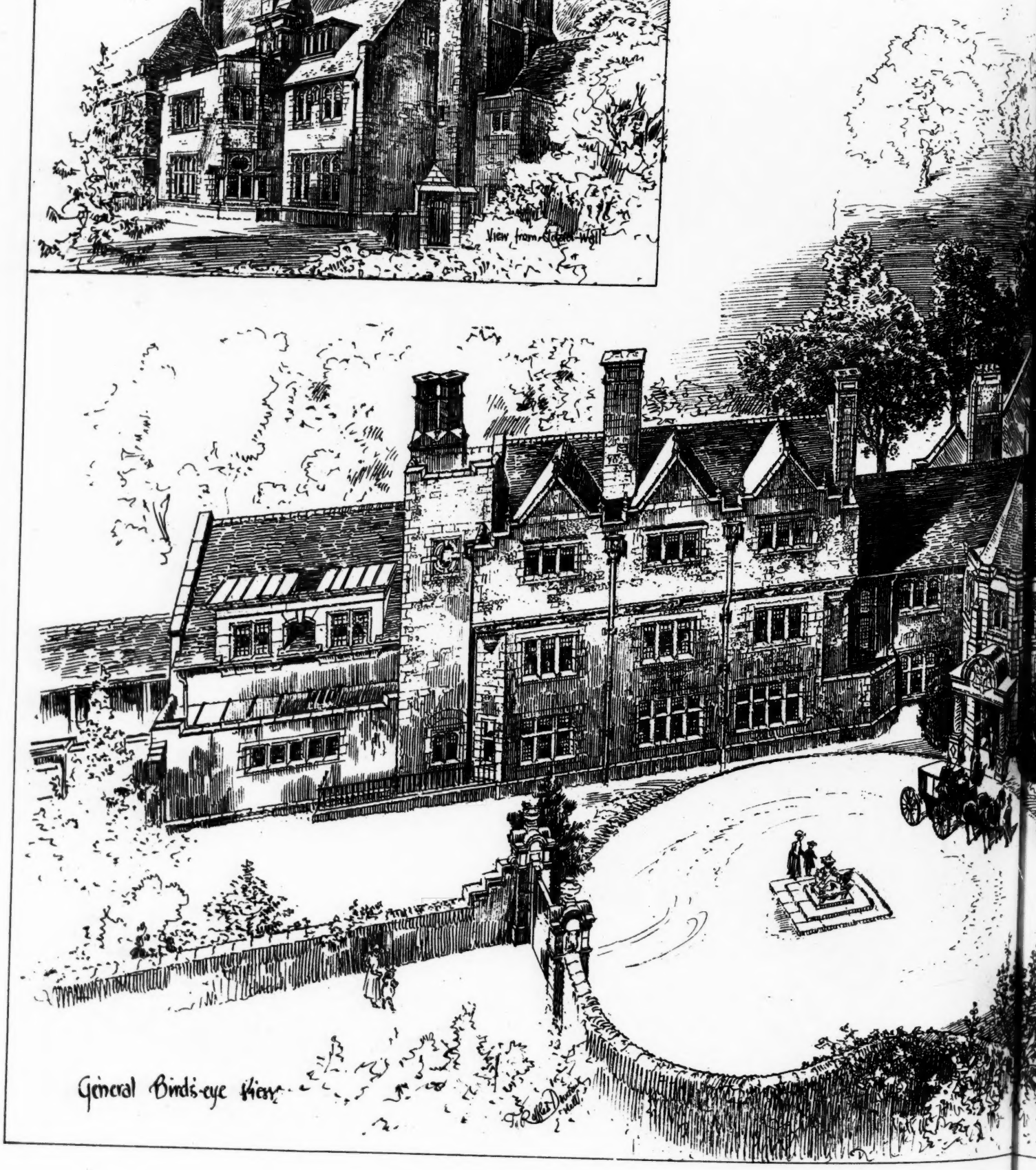

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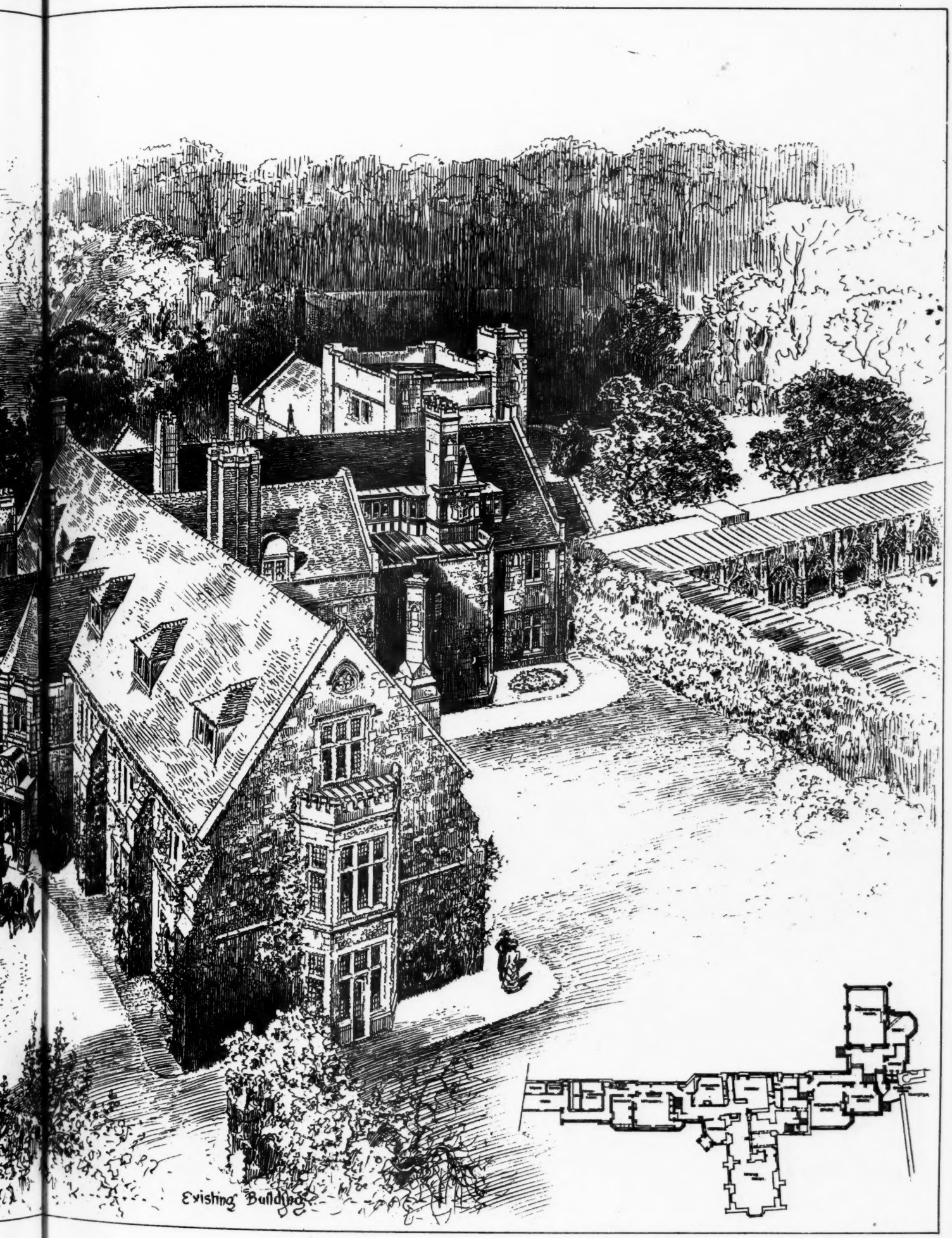

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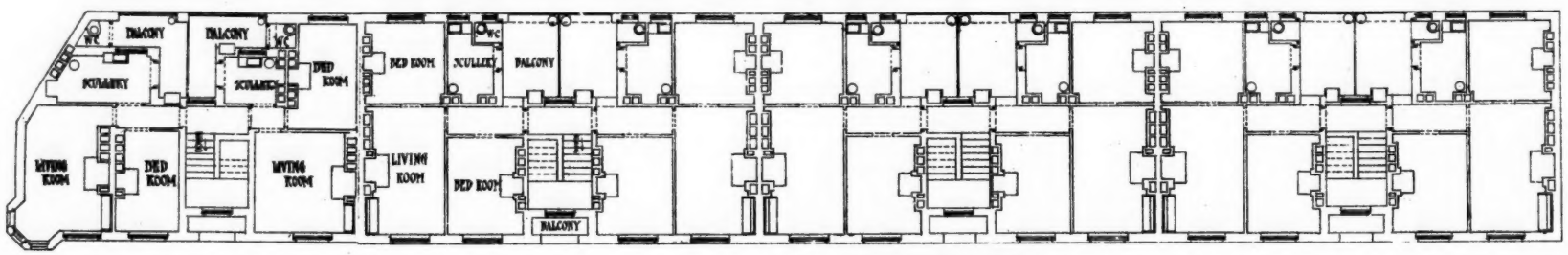

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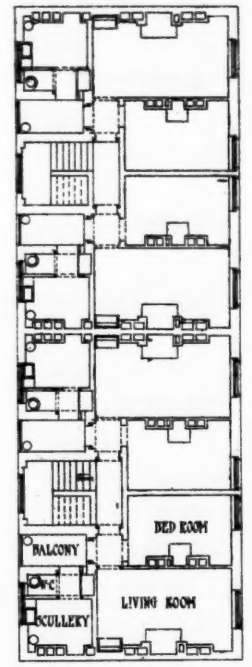

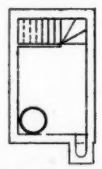

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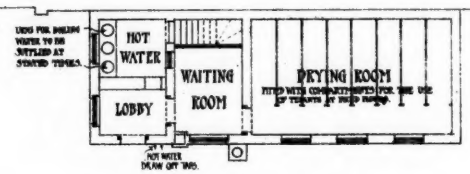

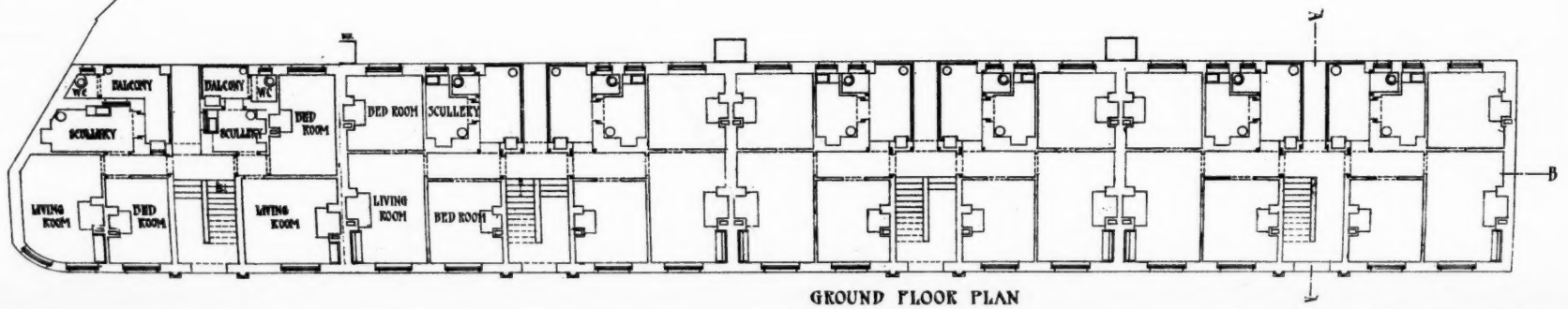

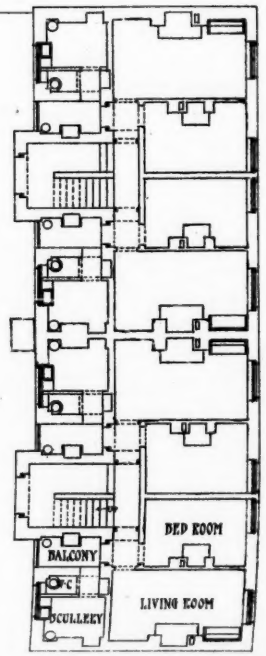

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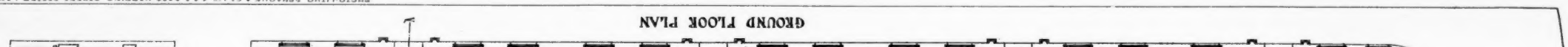

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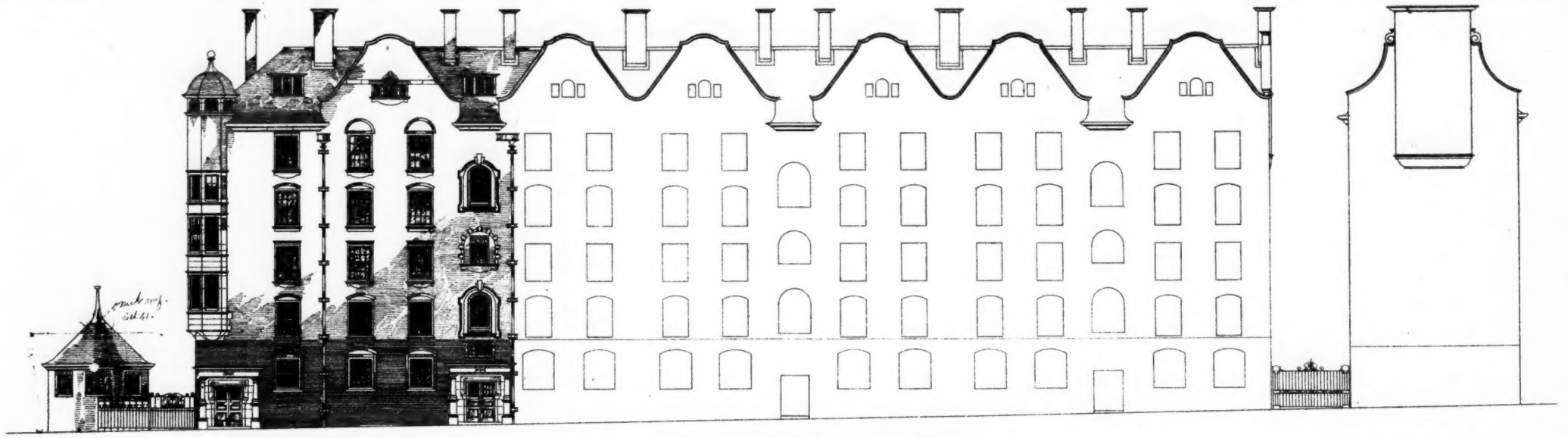

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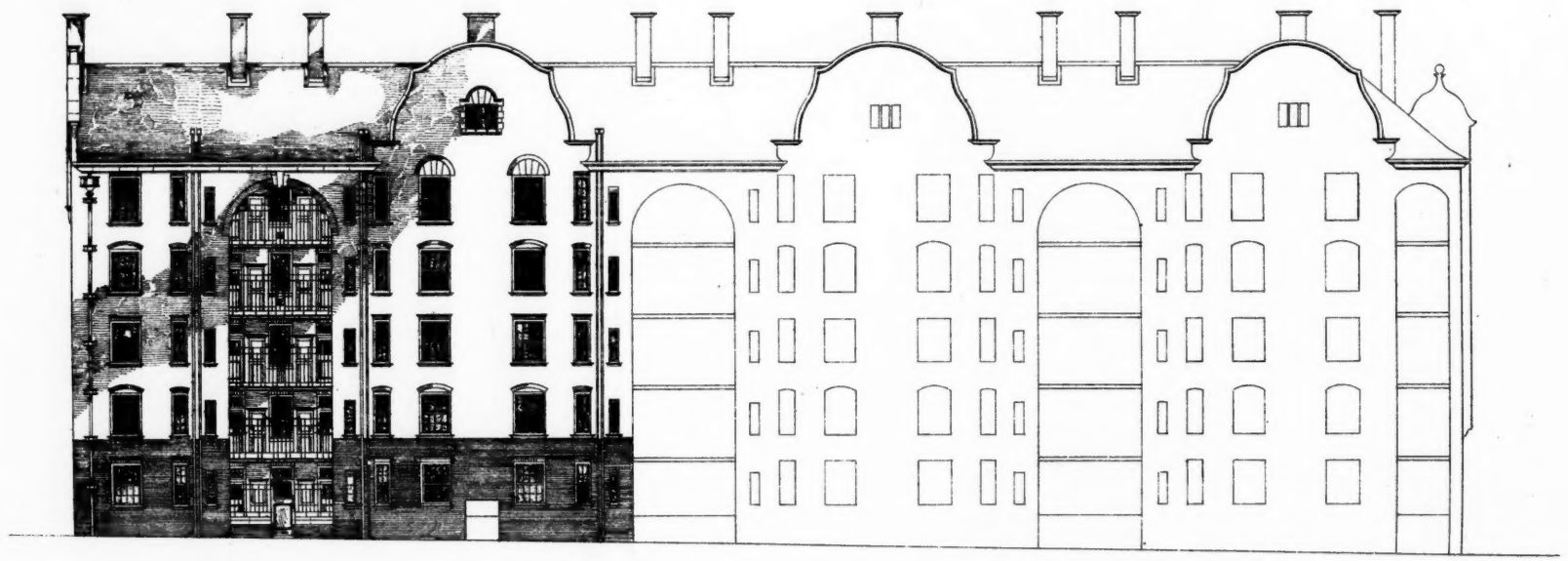

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Scale of Feet

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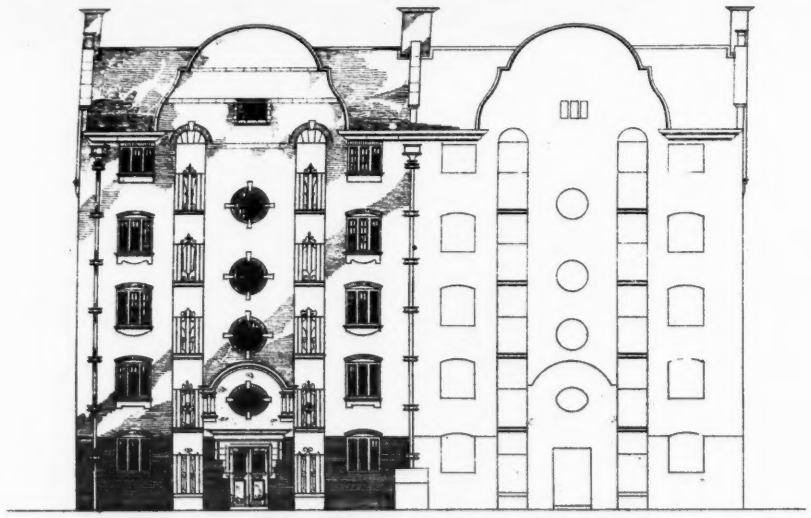

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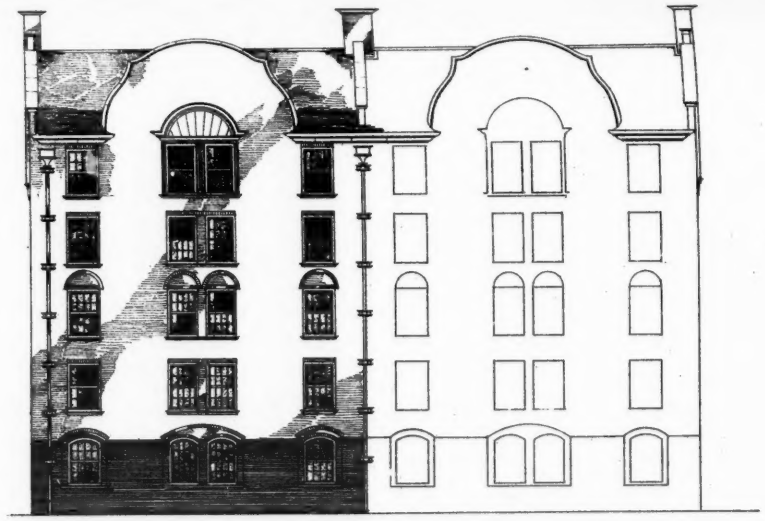

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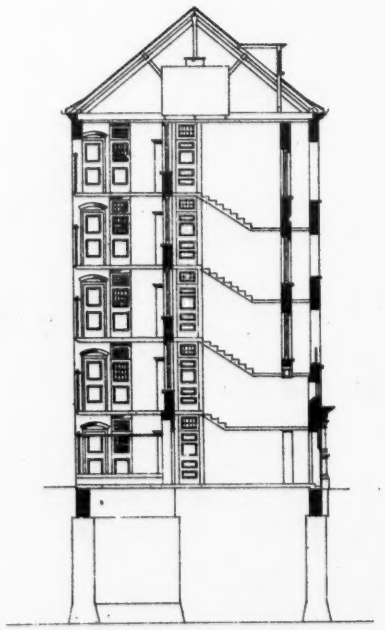

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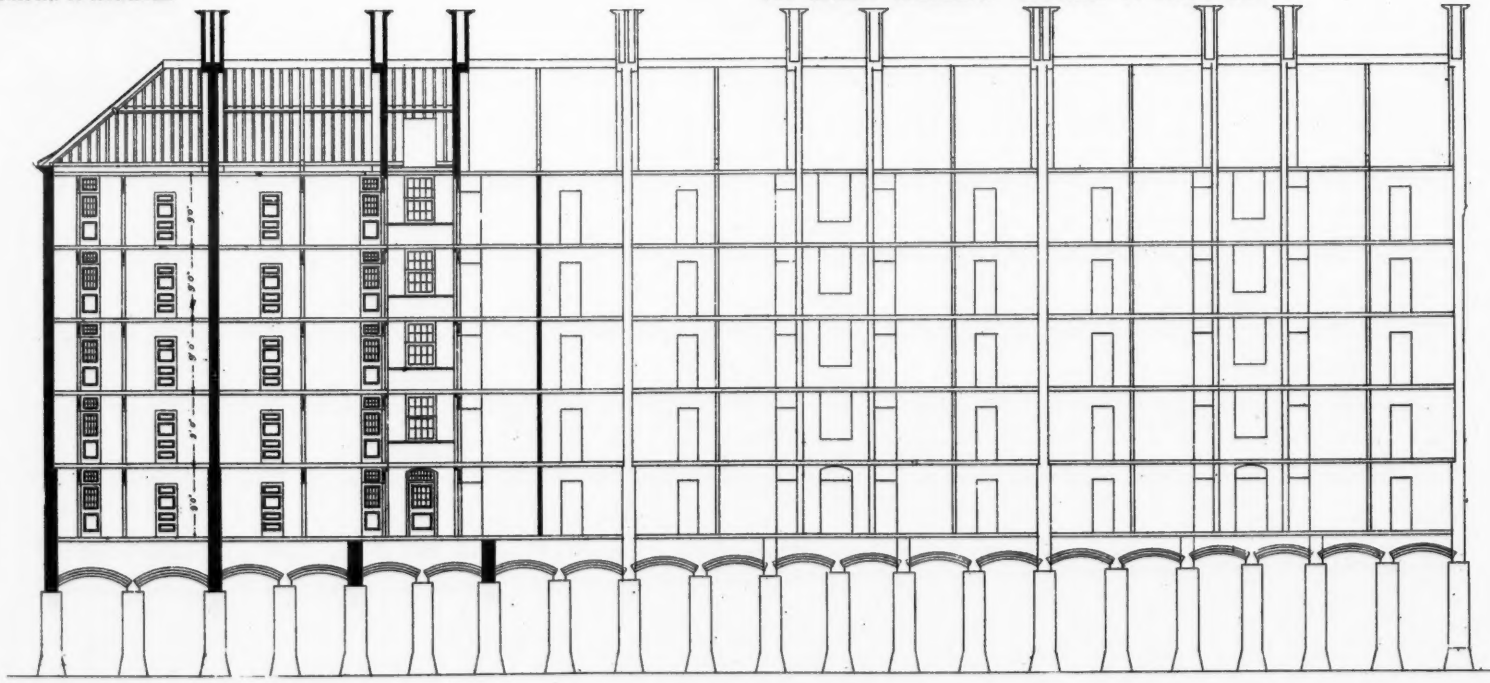

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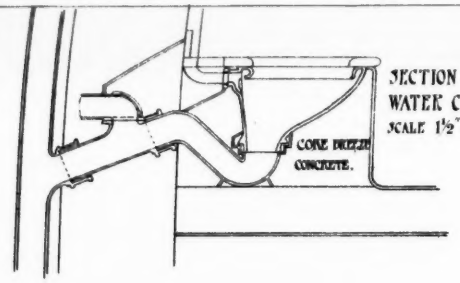

SECTION THROUGH WATER CLOSET
SCALE 1½"-1FOOT

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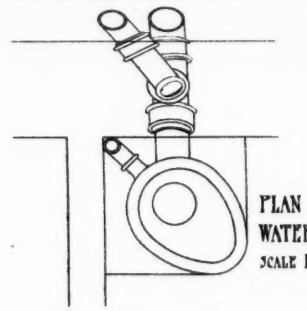
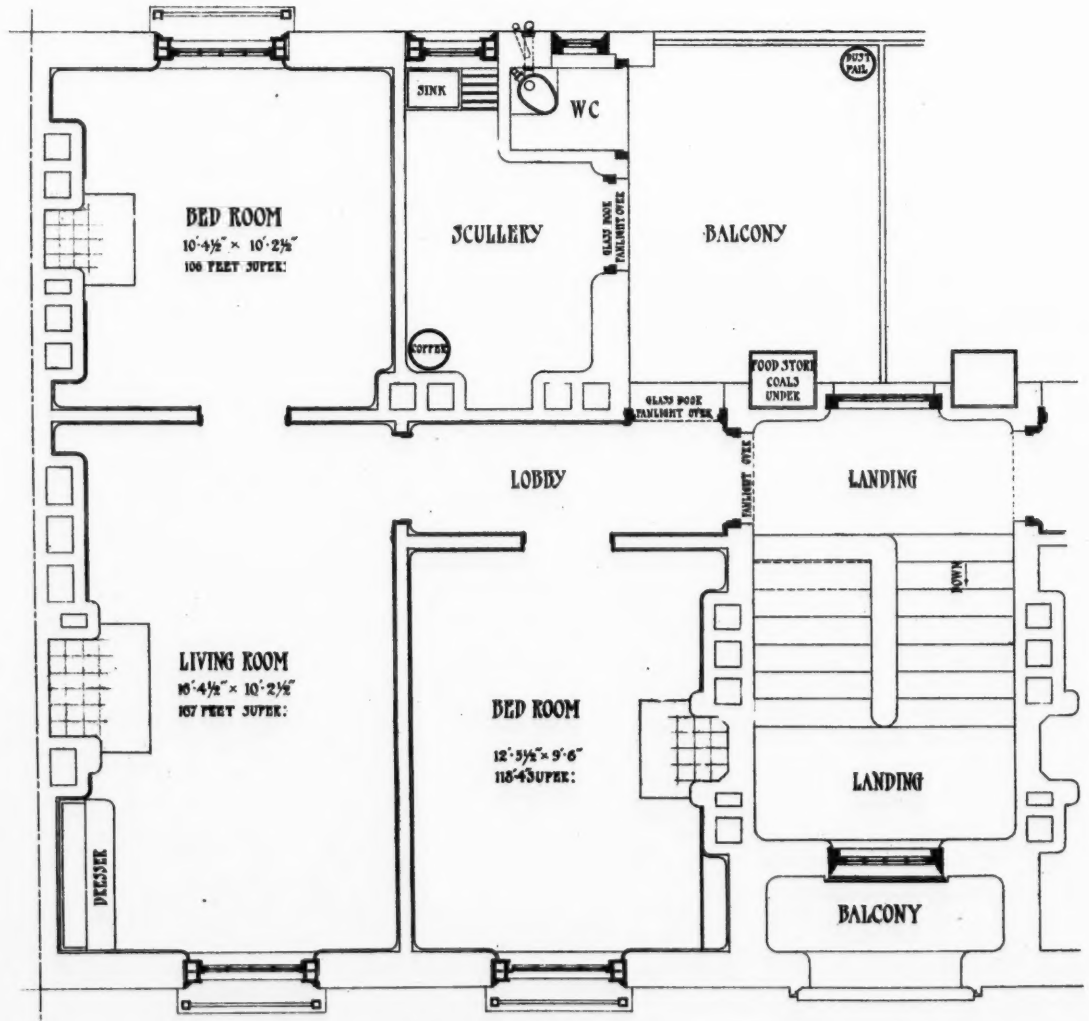
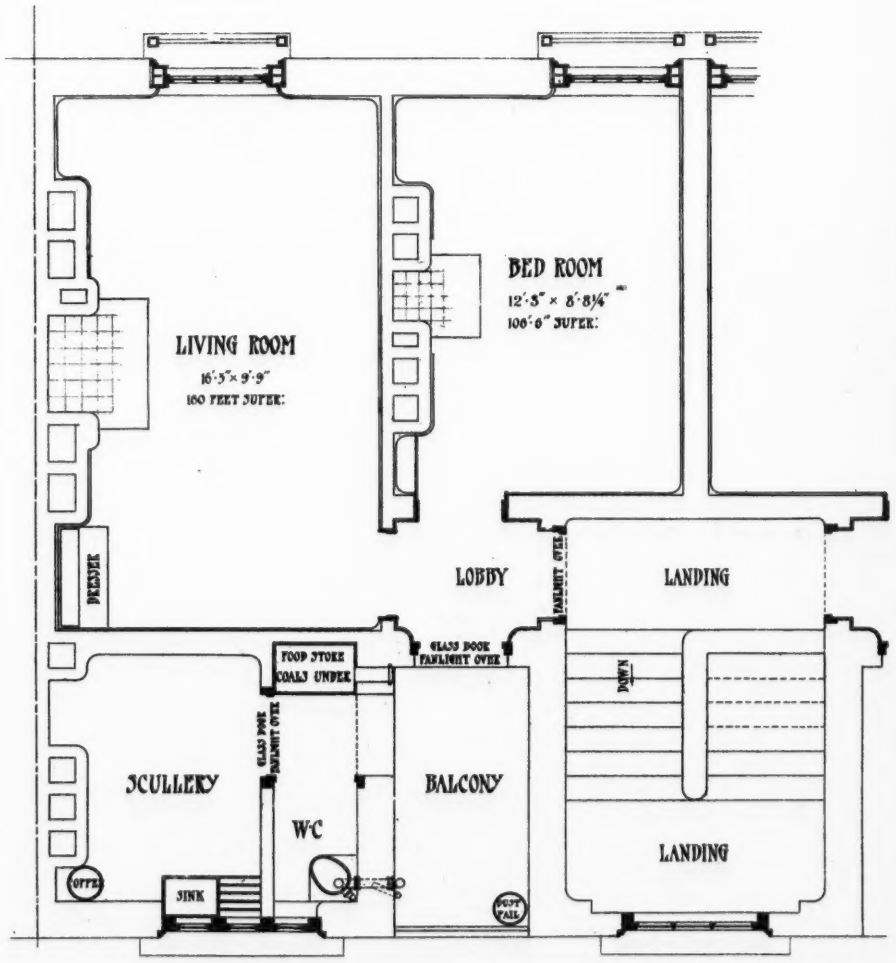


PLAN OF WATER CLOSET
SCALE 1½-1FOOT



"THREE ROOM TENEMENTS"
PLAN OF FOURTH FLOOR



TWO ROOMED TENEMENTS
PLAN OF FOURTH FLOOR

PHOTO-LITHO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

View of Chapel & North Front

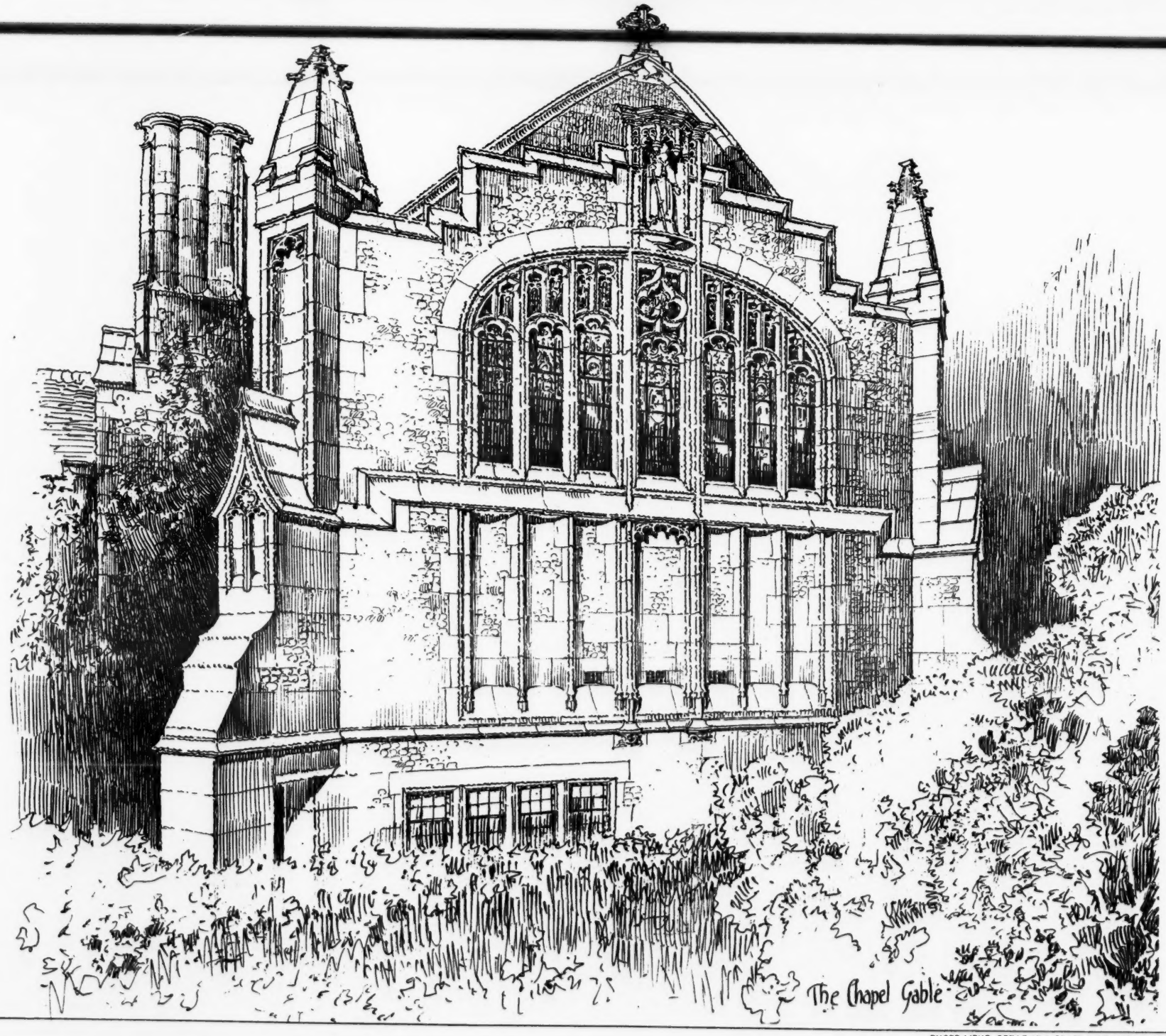


PHOTO-LITHO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

THE ARCHBISHOP'S PALACE, CANTERBURY.—Mr. W. D. Caröe. F.R.I.B.A., Architect